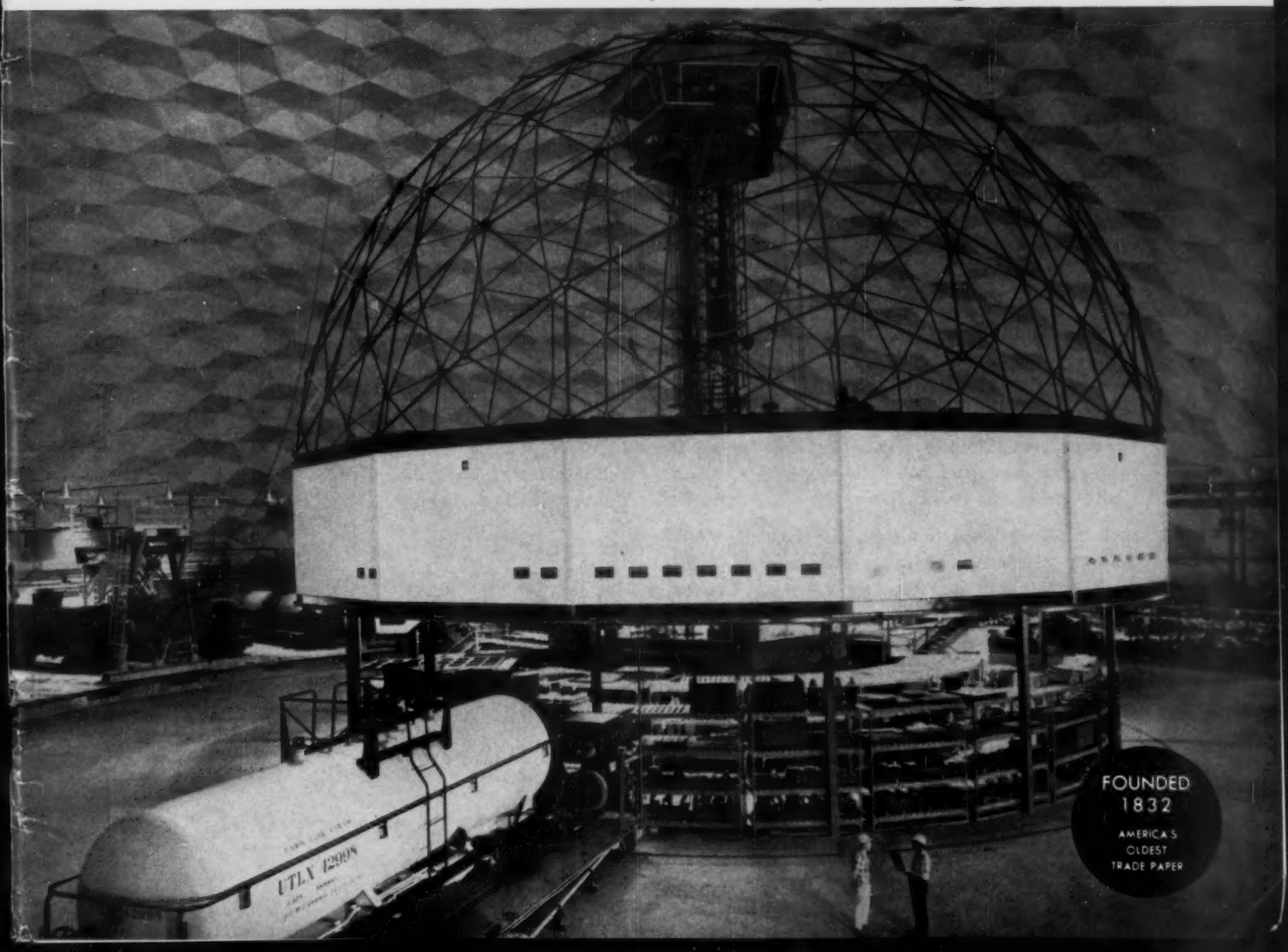
C&NW Bi-Level Mainliners Go Into Service ..... Page 32

# RAILWAY LOCOMOTIVES AND CARS

A SIMMONS-BOARDMAN TIME-SAVER PUBLICATION NOVEMBER 1958

Union Tank Builds Unique Car Shop ..... Page 25




FOUNDED 1832
AMERICA'S OLDEST TRADE PAPER

# Maintain high engine availability

## with Texaco 1693 Dieseltex HD-40

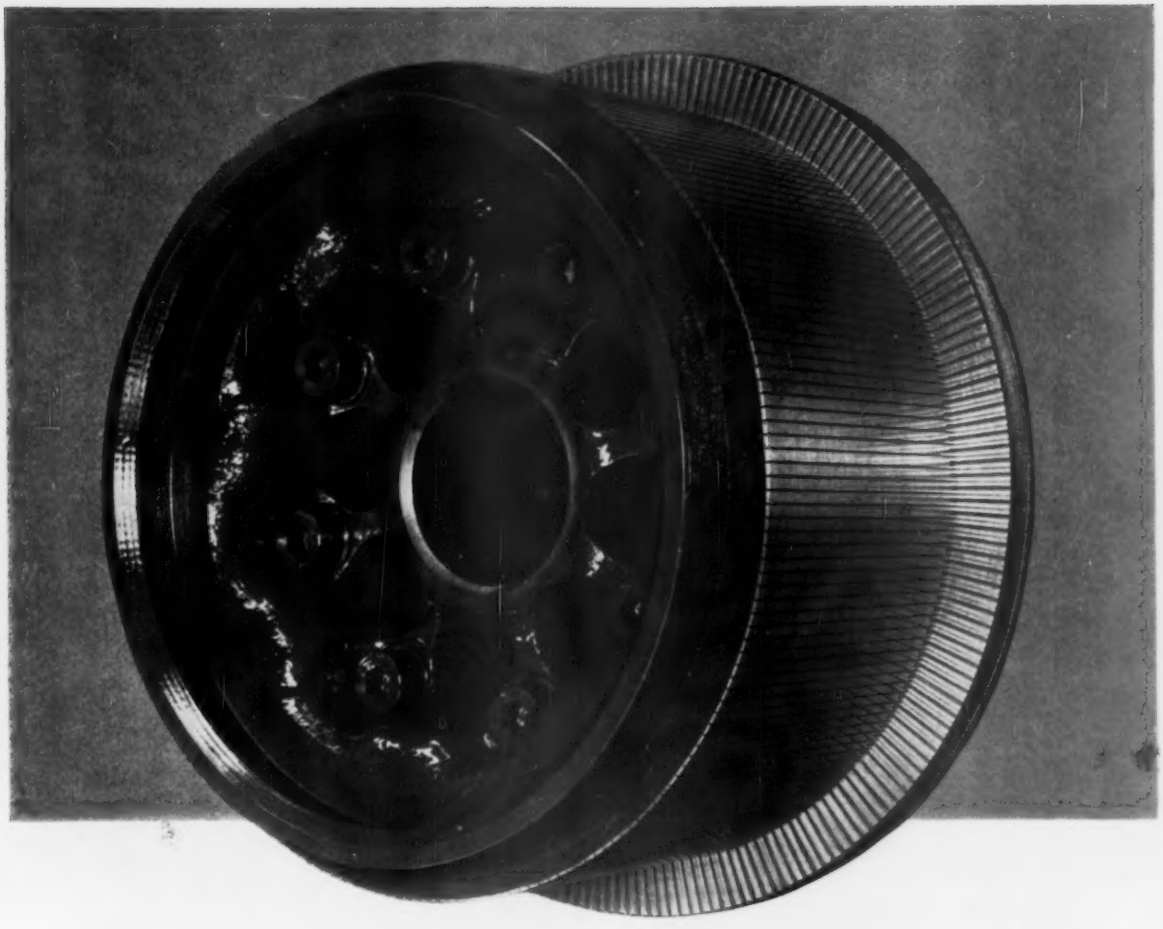
The experience of leading railroads and the approval of all manufacturers of railroad diesels are behind Texaco 1693 Dieseltex HD-40. Here's why:

**1693 Dieseltex keeps top decks** and engine interiors clean. Its detergent and dispersive action prevents formation of harmful deposits. Rings and valves stay free for proper compression and full power. Its exceptional filterability for a dispersant type oil results in reduced ring, liner and bearing wear.

**For more information** about Texaco 1693 Dieseltex HD-40, and Texaco's Systematic Engineering Service, call the nearest Railway Sales Division office—there's one in New York, Chicago, San Francisco, St. Paul, St. Louis and Atlanta—or The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



# NATIONAL commutators for traction motors

## *guarantee excellent performance because...*

1. Archbound construction holds segment mica in place by compression. It puts all the steel V-ring pressure radially inward on the 30° cone, wedging one commutator bar against the other in keystone fashion.
2. Mica V-rings bonded with epoxy blended resin withstand higher temperature and speed.
3. High silver content copper alloy bars operate at elevated temperatures without softening.
4. Segment mica is epoxy bonded to prevent breaking and throwing out of risers.

**NATIONAL ELECTRIC COIL COMPANY**

**COLUMBUS 16, OHIO, U. S. A.**

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

# A NEW FIBER GLASS INSULATION

## developed specifically to meet the requirements of the TRANSPORTATION INDUSTRY

# Transulite

Transulite is a lightweight, resilient blanket made of extremely fine glass fibers bonded together with a thermosetting resin.

It's UNIQUE because a specially developed binder minimizes moisture pick-up, even under severe operating conditions.

Because TRANSULITE is especially designed for the transportation industry it offers:

**Superior Thermal Performance** — one of the most efficient on a heat-resistance-to-weight ratio.

**Superior Resistance to Moisture** — when tested for 14 days in a humidity cabinet—such as used in the railroad industry for refrigerated cars — total moisture pick-up by absorption and adsorption combined was below the maximum permitted by the specifications.

**Superior Resistance to Vibration**—the most troublesome over-the-road operating conditions present no hazard. TRANSULITE holds its position . . . resists sagging or settling when properly installed.

**Superior Durability**—protects your longterm investment because the inorganic glass fibers will not burn, rot or sustain rodents and vermin.

TRANSULITE'S extreme light weight adds very little to overall unit weight . . . permits increased payloads . . . makes it easier to install! TRANSULITE is pleasant to handle . . . rolls are compressed to require less storage space.

Available in thicknesses and densities to meet specific requirements. Widths up to 120".

Find out how TRANSULITE, as well as Super·Fine, Microlite and Microtex, other products of L·O·F Glass Fibers Company, answer insulation problems for passenger cars, box cars, tank cars and cabooses.

Write: *L·O·F Glass Fibers Company, Dept. 56-118, 1810 Madison Avenue, Toledo 1, Ohio.*

**L·O·F GLASS FIBERS COMPANY**

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RAILWAY
LOCO-
MOTIVES
AND
CARS

The Oldest Trade Paper
In the United States

NOVEMBER 1958—VOL. 132 NO. 11

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# REPORT FOR NOVEMBER

## Exhibits Scheduled for 1959 Mechanical Convention

The annual meeting of the Allied Railway Supply Association on September 17, 1958, voted to hold an exhibit September 20-23, 1959, at the Hotel Sherman, Chicago. This exhibit will be held in conjunction with the annual meetings of the Air Brake, Car Department Officers, Locomotive Maintenance Officers, and Railway Fuel and Operating Officers Associations. The Sherman will have more exhibit space available in 1959. The Allied Railway Supply Association is also investigating the possibility of having a track exhibit in addition to the exhibit at the hotel; it has been determined that such an exhibit is feasible.

The outgoing president, C. R. Busch (Unit Truck Corp.) presided at the meeting. New officers elected for 1958-59 are: president, G. L. Green (Pullman-Standard Car Mfg. Co.); first vice-president, H. C. Hallberg (Waugh Equipment Co.); second vice-president, D. I. Packard (Brandon Equipment Co.); third vice-president, C. E. Grigsby (American Steel Foundries); treasurer, J. G. Rees (Westinghouse Air Brake Co.); secretary, A. R. Nelson (W. H. Miner, Inc.). J. D. Ristine continues as executive secretary.

## Filter Design Improved By Radioactive Analysis

Such information as interior flow rates and adsorption areas, which contributes to positive air-brake operation, is being obtained on the Vapolex filter manufactured by the Air Brake Division of the Westinghouse Air Brake Company through the use of radioactive tracers developed by the Nuclear Science & Engineering Corp., Pittsburgh.

Unless filtered, the oil picked up from the compressor on a locomotive and carried along with the air passing into the brake system accumulates as a varnish-like deposit on valves and hinders air-brake operation. Because this oil passage is in vapor form, prior methods of measuring its volume were not positive. By introducing a radioactive isotope into the compressor crankcase oil, Nuclear Science can meter and chart the degree of radioactivity present at critical points in the air system and thus determine filter efficiency, permissible degree of saturation, and service interval for replacement of filter element.

## High-Horsepower Locomotives Are Under Test

General Motor's new high-horsepower SD-24 locomotive being demonstrated on the Duluth, Missabe & Iron Range is, essentially, an SD-9 with a turbosupercharger which boosts horsepower to 2,400. It has all-electric controls, including a new 16-stage transition.

The first of the 8,500-hp General Electric gas turbine-electrics is in experimental service on the Union Pacific, handling freight runs between Omaha and Ogden. The UP has 30 of the units on order. At the same time, the UP has been testing a 9,900-hp. gas turbine-electric locomotive produced by coupling two of its older 4,500-hp units in multiple. Fuel is being carried on a tender between the two units.

*(Turn to page 10)*

## TIME SAVING IDEAS FOR NOVEMBER

*MOTIVE POWERS AND CAR*

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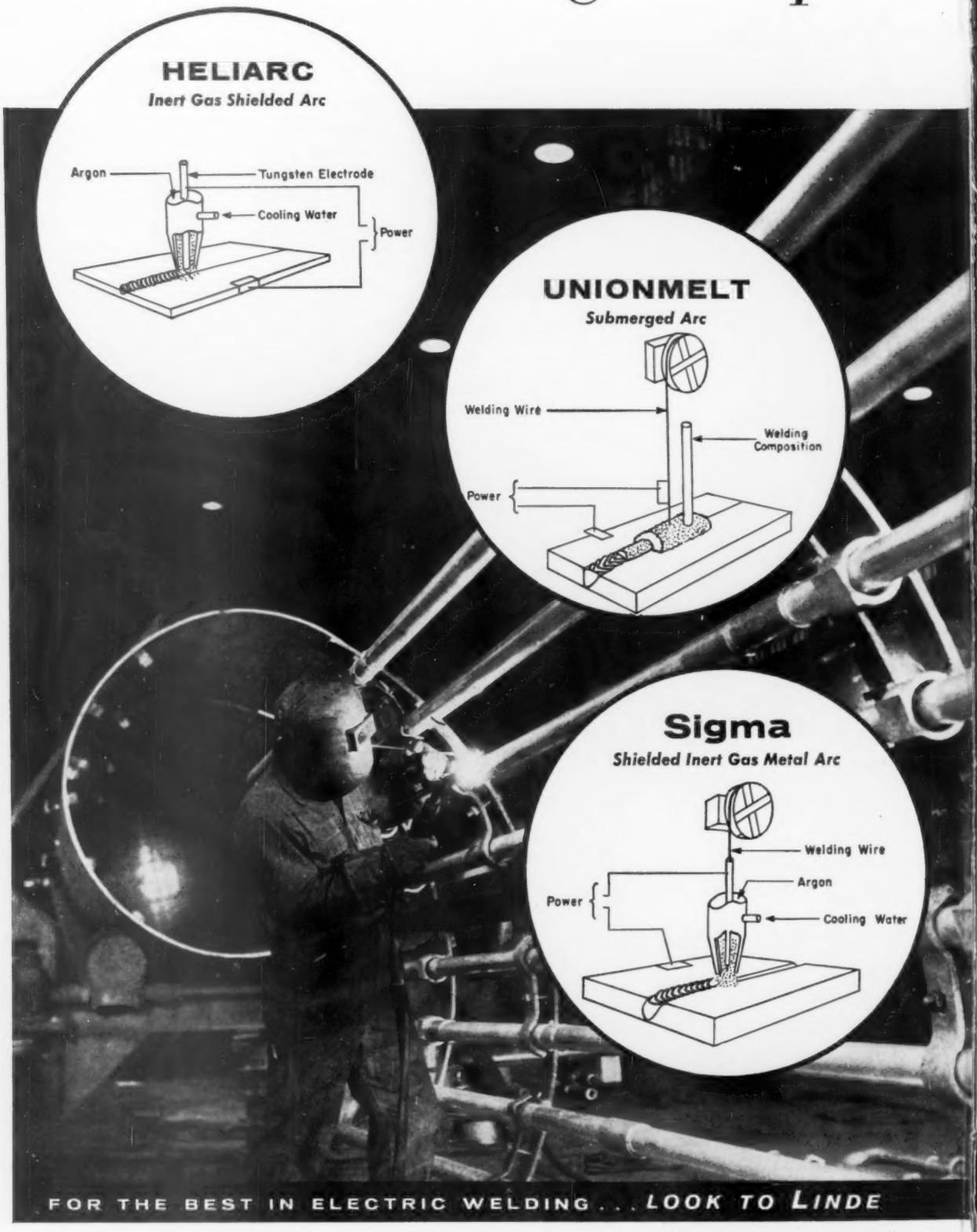
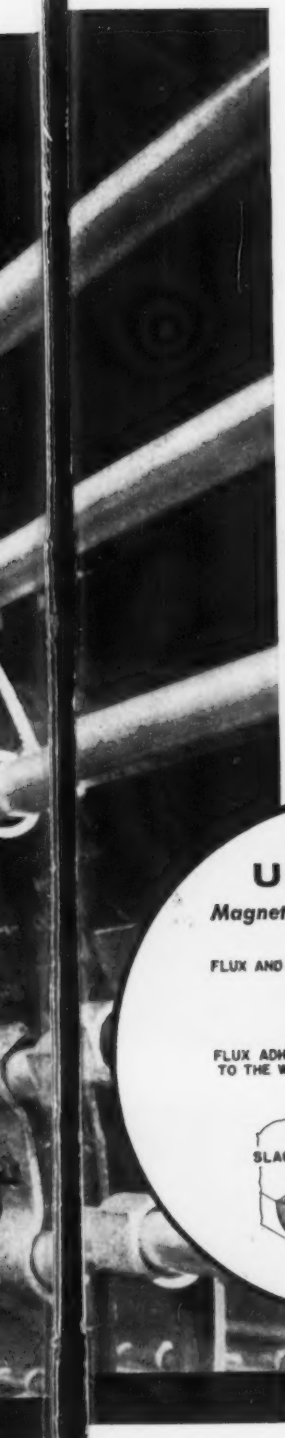
# *From Car Building to Repair*



# . . . LINDE provides the *right welding method!*



### *Inert gas shielded arc welding—*

HELIARC Welding is helping railroads save up to 88% of new rolling stock cost by simplifying and speeding many car fabrication jobs. This process, using a tungsten electrode and a shield of LINDE argon, is tops for joining hard-to-weld commercial metals. HELIARC Welding produces high-quality welds that resist corrosion and eliminate costly grinding and finishing.

### *Submerged arc welding—*

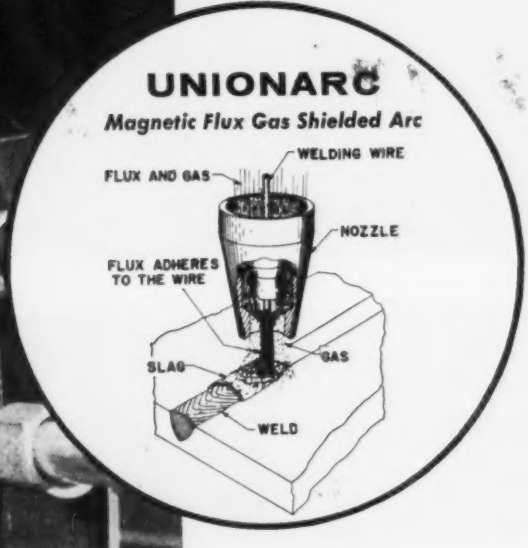
Big savings in time and materials in the fabrication and reconstruction of all types of rolling stock are made possible with UNIONMELT Welding. Materials ranging from light gage to heavy plate, adaptable to mechanization, can be most economically joined by UNIONMELT Welding. UNIONMELT Welding is also used extensively for resurfacing metal, providing extra wear and corrosion resistance.

### *Shielded inert gas metal arc welding—*

One of the most versatile welding methods for railroad car fabrication is Sigma Welding. LINDE's Sigma apparatus, using a shield of LINDE argon, is ideal for manual welding of commercial metals ⅛ in. or more thick, and for automatic operation on lighter gage metals to .050 in. Highest quality welds can be made on aluminum thicker than ⅛ in. at speeds up to 16 inches per minute. Build-up and surfacing jobs are also improved by using LINDE's Sigma welding method.

### *New! Magnetic flux gas shielded arc welding—*

UNIONARC Welding, LINDE's latest contribution to the railroad industry, is an extremely fast method for welding mild steel. This method employs a continuously-fed, bare steel wire electrode, magnetically coated with flux conveyed in a stream of carbon dioxide shielding gas. Manual welds can be made easily in any position—vertical, overhead, downhand—with no stops to change electrodes. The speed, versatility, and ease of operation of UNIONARC Welding brings costs down 25% to 65% below those of manual covered electrode welding. Clean, smooth, high-quality welds are provided, even in the presence of moderate amounts of rust, scale, and moisture.




LINDE engineers have worked with railroad men for many years designing, developing and testing electric welding methods and apparatus . . . to improve road maintenance, equipment repair and shop fabrication. This wealth of experience is yours for the asking. Just call your nearest LINDE office.

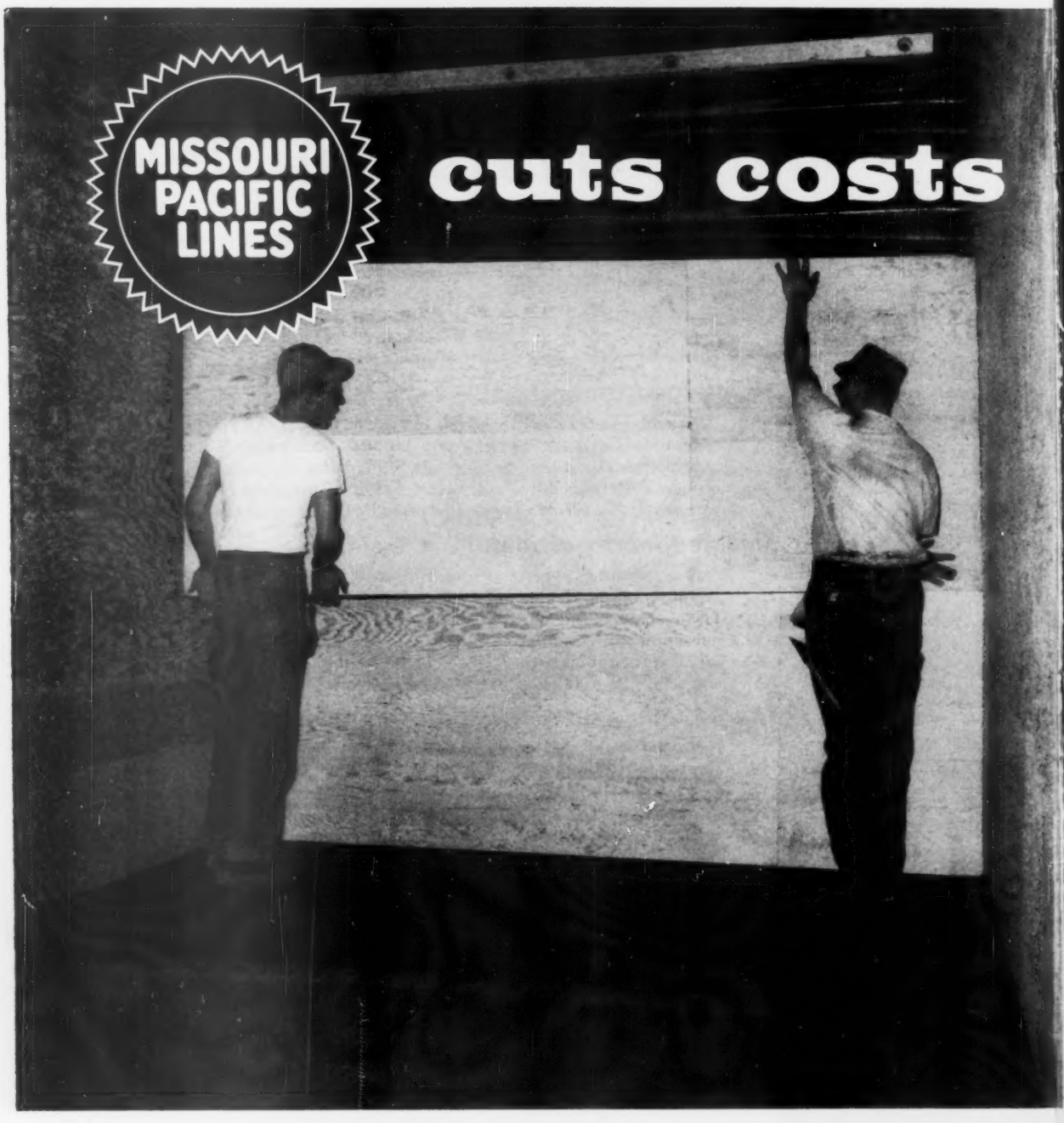
LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

RAILROAD DEPARTMENT

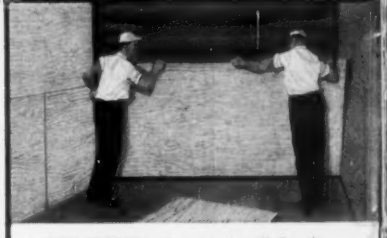
Linde TRADE-MARK

UNION CARBIDE

The terms "LINDE," "HELIARC," "UNIONMELT," "UNIONARC," and "UNION CARBIDE" are trade marks of Union Carbide Corporation.




**Only Exterior Fir Plywood car lining has all these advantages:**



**LOW COST**—Easy to install fir plywood lining speeds work . . . saves 50 per cent and more in labor costs alone.

# with Fir Plywood boxcar lining

## Missouri-Pacific reports Exterior plywood speeds work, saves 10 man hours per car

EXTERIOR FIR PLYWOOD car lining plays an important role in the big, fast-moving operation at Missouri-Pacific's construction yard at DeSoto, Missouri, where modern assembly line techniques can send a new boxcar into service every hour of the day.

The in-place cost of the plywood car lining is less than T & G lumber, chiefly because it can be installed so much faster. Shop officials estimate that fir plywood saves over 10 man hours per 40-foot car. Total lining costs (including labor and materials) comes to less than $220 per car.

For Mo-Pac fir plywood has demonstrated its superiority in other ways, too. Interior surfaces are smooth, and the danger of infestation is minimized. Shippers like it because it's a clean (and easy-to-clean) lining that protects valuable ladings. Waterproof Exterior plywood is a strong, tough, rugged material capable of shrugging off blows that would split ordinary lumber.

Over the long haul, too, fir plywood lining pulls its freight with lower maintenance and longer life.

At their DeSoto shops, Mo-Pac does big things in a big way, *fast*. Specially developed high-speed assembly line technique sends 8 new boxcars into service every day.

Exterior plywood is nailed horizontally with ¾" fir plywood for side walls and 1" fir plywood for end walls. Crews use cement-coated nails with a special spiral thread for better holding power.

FOR MORE INFORMATION about fir plywood—its uses, properties and advantages—write

**DOUGLAS FIR PLYWOOD ASSOCIATION**
TACOMA 2, WASHINGTON

—an industry-wide organization devoted to research, promotion and quality control

*Always specify by DFPA grade-trademarks*

DFPA TESTED QUALITY

**STRONG**—Plywood has tremendous impact resistance . . . shrugs off blows that would split ordinary lumber.

**SMOOTH**—Clean, snag-free fir plywood lining pays off by yielding higher tariffs on fragile ladings.

**WATERPROOF**—Exterior plywood is made with waterproof marine glue, in several sizes and grades, including overlaid panels with hard, smooth, fused-resin fiber overlays.

# REPORT *FOR NOVEMBER—Continued from page 5*

## Miscellaneous Publications

WELDING HANDBOOK. Section II of Fourth Edition of Welding Handbook covers gas, arc and resistance welding processes. Contains 13 chapters, each with a bibliography and its own table of contents. Processes of similar nature grouped, followed by chapter describing various types of equipment and accessories available.

*American Welding Society, 33 West 39th st., New York 18. Price, $9.*

## Personal Mention

**Chicago, Milwaukee, St. Paul & Pacific.**—*Milwaukee:* WAYNE N. BITTNER, shop engineer, appointed superintendent locomotive shops, succeeding C. G. BENKENDORF, deceased. HAROLD T. ODEGAARD appointed shop engineer, locomotive, wheel and forge shops at Milwaukee and Tomah, Wis.

**Florida East Coast.**—*St. Augustine, Fla.:* E. H. SCHOEDINGER, assistant chief mechanical officer, appointed chief mechanical officer, succeeding C. A. GAMMON, promoted.

**Seaboard Air Line.**—*Richmond, Va.:* W. M. HARRISON, JR., mechanical engineer, appointed assistant to chief mechanical officer, succeeding HENRY W. JARRETT, retired. E. T. STEWART, JR., appointed diesel supervisor (system), succeeding H. R. BOYETTE, promoted.

**Southern.**—*Atlanta, Ga.:* GEORGE L. SOUTHER, JR., appointed master mechanic. *Ludlow, Ky.:* WALTER G. SCHWEINEBRATEN appointed master mechanic.

## Orders and Inquiries for New Equipment

### Placed Since the Closing of the October Issue

### Diesel-Electric Locomotive Orders

| *Road and builder* | *No. of units* | *Horsepower* | *Service* | *Other detail* |
|---|---|---|---|---|
| GRAND TRUNK WESTERN: | | | | |
| Electro-Motive | 9 | 1,750 | *Road switchers* | Delivered. |
| | 7 | 900 | *Yard switchers* | To be delivered by Nov. 30. |

### Freight-Car Orders

| *Road and builder* | *No. of cars* | *Type of car* | *Cap., tons* | *Length, ft.-in.* | |
|---|---|---|---|---|---|
| BALTIMORE & OHIO: | | | | | |
| Company shops | 1,000 | Gondola | 70 | 52-6 | Major components and subassemblies ordered from Bethlehem Steel. Floors to be combination wood and steel. 10 a day being delivered. |
| CANADIAN NATIONAL: | | | | | |
| Canadian Car | 20 | Hopper | 40 | | Delivery to begin late this year. |
| | 50 | Auto. transporter | | 78-0 | 125 cars to be double deck. |
| | 75 | Auto. transporter | | 60-0 | |
| CHICAGO & NORTH WESTERN: | | | | | |
| Pullman-Standard | 1,000 | Box | | 40-6 | To have 8-ft. doors. 90 cars a week being delivered. Est. cost over $7 million. |
| DELAWARE, LACKAWANNA & WESTERN: | | | | | |
| Company shops | 100 | Piggyback flat | | | Being converted from existing equipment. Cars to have sliding ramps and ACF masts. |
| INLAND STEEL: | | | | | |
| General American | 100 | Gondola | | | |
| SACRAMENTO & NORTHERN: (Subsidiary Western Pacific) | | | | | |
| American Car & Foundry | 10 | Covered hopper | 70 | | Est. cost, $123,450. For delivery this month. |
| TIDEWATER SOUTHERN: (Subsidiary Western Pacific) | | | | | |
| Pacific Car & Fdry. | 50 | Insulated | 50 | | 40 to be equipped with D-F loaders. Est. cost of 50, $718,000. |
| TRAILER TRAIN CO.: | | | | | |
| American Car & Foundry | 200 | Flat | | 85-0 | These 400 cars in addition to order for 400 reported in October issue. |
| Pullman-Standard | 200 | Flat | | 85-0 | |
| UNION PACIFIC: | | | | | |
| American Car & Foundry | 50 | Piggyback flat | 70 | 85-0 | 100 cars to be equipped with roller bearings and cost about $1,500,000. For delivery first quarter 1959. |
| Pullman-Standard | 50 | Piggyback flat | 70 | 85-0 | |

FREIGHT CARS:

*Missouri Pacific* authorizes purchase of 100 37-ft. insulated refrigerator trailers and 50 chassis for piggyback transportation of perishables. Estimated cost, $1,200,000.

*Illinois Central* during this last quarter of 1958, will equip 165 box cars for specialty loading; convert 40 box cars to flat cars for piggyback loading; complete 25 steel cabooses, and convert 25 hopper cars for handling wood chips. Repairs will also be made on about 100 cars per month.

*St. Louis-Southwestern* has equipped at company shops 50 52-ft. 6-in. gondola cars with rubber draft gear, three-section removable roof, and four-section movable bulkheads.

## Supply Trade Notes

ELECTRIC STORAGE BATTERY COMPANY, EXIDE INDUSTRIAL DIVISION.—*Evans Taylor,* sales engineering manager at Philadelphia, appointed branch sales manager, Chicago area, succeeding *Cecil W. Wilson,* retired.

Washington, D. C., branch moved from 1819 L st., to 4000 Albemarle st., N.W.

■

GRIP NUT COMPANY.—*C. A. Henrickson* appointed sales manager, railroad division. *E. H. Weigman,* of Weigman Railway Supply Company, Chicago, who has been Grip Nut railway field representative in the midwest, has retired to Tucson, Ariz., where he will be part-time consultant to Grip Nut.

Evans Taylor
Electric Storage
Battery Co.

C. A. Henrickson
Grip Nut Co.

Seymour Becker
Arcair Co.

S. A. Thompson
Thomson-Manning
Corp.

ARCAIR COMPANY.—*Seymour Becker* appointed field representative, New England states.

■

THOMSON-MANNING CORPORATION.—*S. A. Thompson* appointed director and vice-president of Thomson-Manning, a new corporation at Lynn, Mass., offering railwelding service and other railroad products. Mr. Thompson previously railroad sales manager of Sperry Rail Service, Division of Sperry Products, Inc.

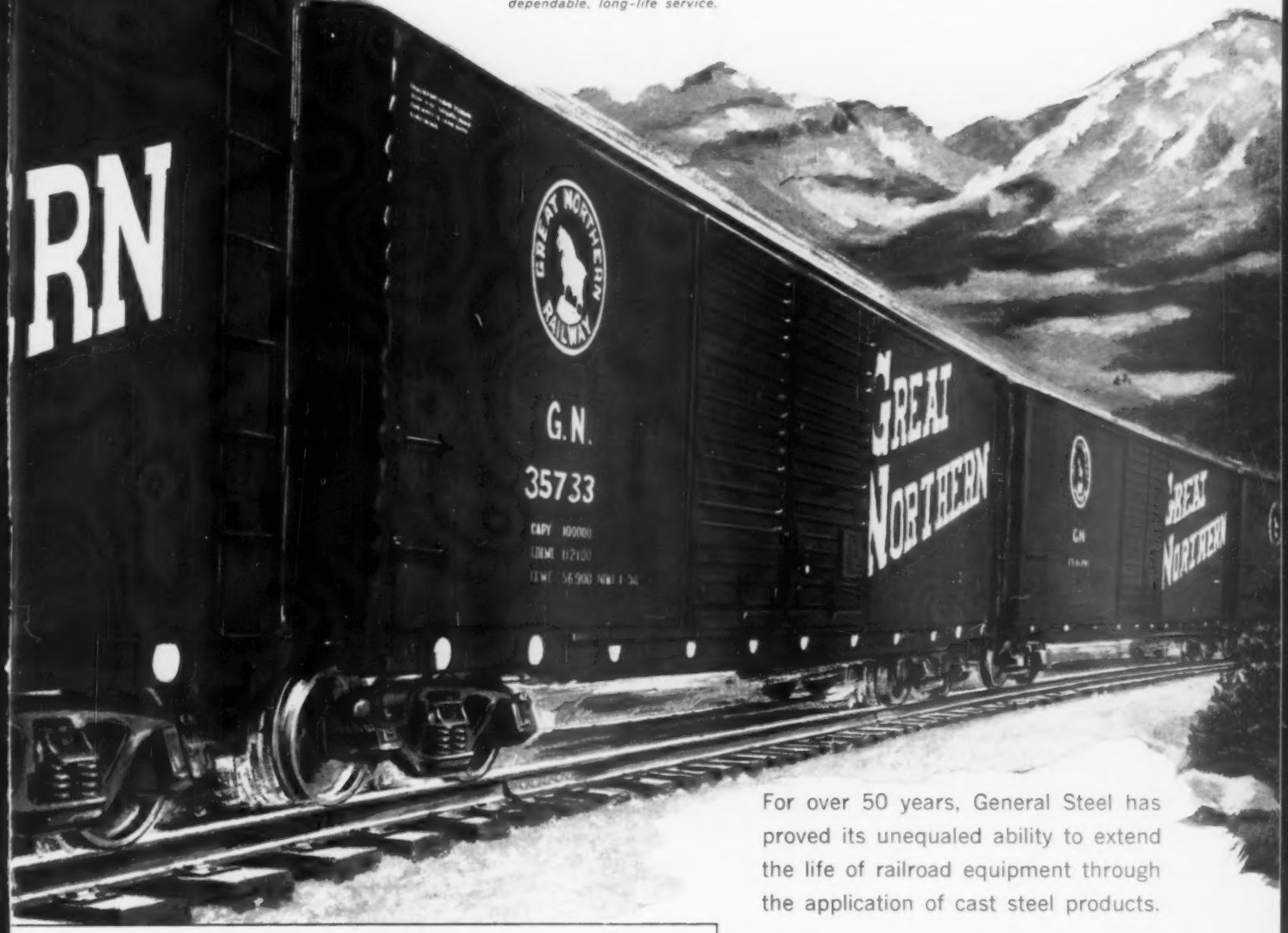
■

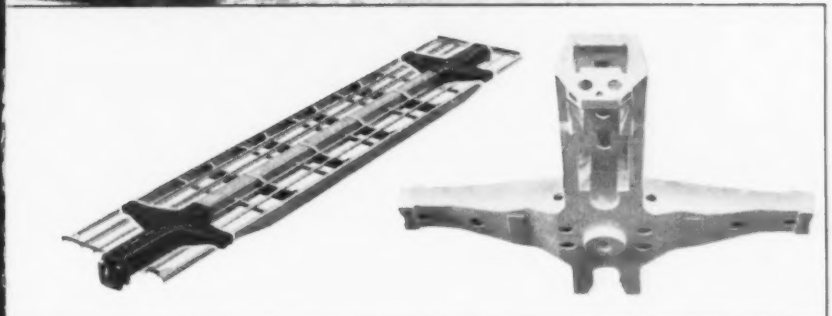
SPERRY RAIL SERVICE, DIVISION OF SPERRY PRODUCTS, INC.—Duties of *S. A.*

*(Continued on page 67)*

# Where railroad progress is cast in steel....

*Many Great Northern Box Cars roll across America's road beds—equipped with General Steel one-piece underframe ends that assure dependable, long-life service.*



*Underframes with one-piece cast steel ends provide great strength, eliminate body bolster failures, resist rust and corrosion and simplify car construction or rebuilding.*

*General Steel underframe ends provide the following features for new or rebuilt cars: integral body bolsters, draft gear stops, strikers, coupler carriers, center fillers, center plates and side bearing pads.*

For over 50 years, General Steel has proved its unequaled ability to extend the life of railroad equipment through the application of cast steel products.

General Steel engineering utilizes the great strength and minimum weight of one-piece steel castings . . . together with their extra ruggedness and freedom from maintenance . . . to cut operating expenses for rail and industrial users the world over.

An investment in General Steel products today means a more profitable future.

## GENERAL STEEL CASTINGS

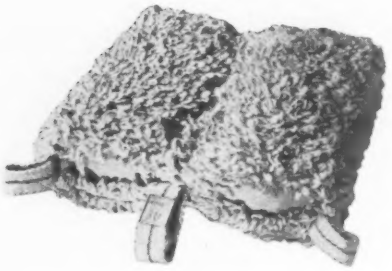
GEARED TO PROGRESS
RPI MEMBER

GRANITE CITY, ILL. • EDDYSTONE, PA. • AVONMORE, PA.

# LOCOMOTIVES AND CARS WHAT'S NEW IN EQUIPMENT

## Metal Removal Torch

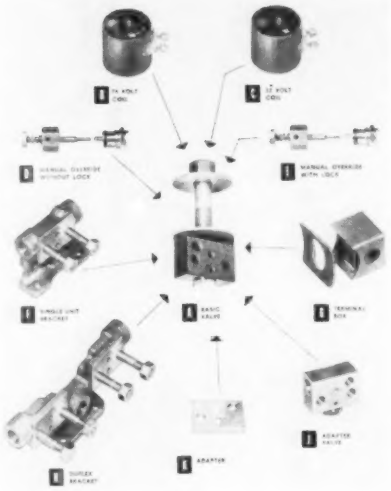
The Model H-2 Arcair torch, which replaces the Model G-2, is the smallest manually operated Arcair torch. It is designed for intermittent applications and for light uses of the Arcair process. It has a positive air control valve in the torch handle and, by holding the air orifice in the head of the H-2 within 4 in. of the work, the torch can be operated on as low as 40 psi of compressed air—half the required minimum air pressure used by the larger models. The torch has heat-resistant molded insulators. *Dept. 137, Arcair Company, Dept RLC, Lancaster, Ohio.*



## Lubricator Pad

The new Magnus lubricator pad, which features three-way wicking, large oil capacity, and one-piece twin-lobe construction, has been approved by the AAR Mechanical Division for interchange test installations. The pad is a one-piece unit consisting of two elliptical spring cores around which is wrapped a $^{5}/_{16}$-in. thick felt inner liner covered with a tufted cotton fabric. Each lobe of the pad is laced with eight perpendicular candle wicks surrounding a polyurethane center core. Both ends are covered with heavy bolting cloth. Webbing loop handles at the center of either end and at each corner aid in removal. Three firmly connected flat steel springs in each lobe maintain constant and correct pressure on the journal. They are secured to the underside of the felt and cover and are riveted to spring steel spacer strips.

Each pad is 6 in. by 11 in. and holds up to 5.9 pt of oil, depending on the size required by axle capacity. It is said to be the only pad type lubricator with internal wicks that are not entrapped in the uplift medium. The pad has two wear surfaces. After operation through one repack period and reclamation, it may be reapplied with the clean unused side in contact with the journal. *Magnus Metal Corporation, subsidiary National Lead Company, Dept. RLC, 111 Broadway, New York 6.*



## Solenoid Valve

These railroad-type solenoid (magnet) valves for diesel-electric and electric locomotive applications, make possible the alteration of a basic valve into solenoid valves for various requirements. Two or more of the 10 basic components shown can be combined to assemble valves for over 40 locomotive applications.

This valve simplifies maintenance because it can be repaired without special tools, and can be serviced without disturbing locomotive piping. It can be furnished for 32-volt or 74-volt d-c applications. *Prime Manufacturing Company, Dept. RLC, 1669 S. First st., Milwaukee 4.*

## Adjustable Bulkhead

An adjustable "bookend" bulkhead, first built and tested two years ago, has been strengthened and is undergoing further tests. The movable bulkhead, designed to fit any standard AAR flat car, now has two horizontal, instead of three, vertical panels of Metalclad plywood. A 12-in. reinforcement channel shelf at top provides a rigid support for the telescoping type diagonal braces, the ends of which lock securely in the stake pockets. At the bottom, a 10-in. movable channel locks in place on each side to a horizontal box-section weldment which can be freely positioned and anchored in the stake pockets. The 10 ft wide and 8 ft high bulkhead is held in place also by pins through gussets welded to the top and bottom channels.

The design, as before, allows the bulkheads to be placed flush against lading, such as plywood, lumber, gypsum shipments, etc., and eliminates much dunnage. Weight of the assembly is 1,600 lb. Rectangular holes in the bulkhead permit positioning with a forklift truck and for application or removal from car if necessary or desirable. *Industrial Development Services, Dept. RLC, Des Moines, Iowa.*

## Pipe Cutters

A line of pipe cutters, designed to give cleaner, straighter cuts, feature new high-alloy steel cutting wheels, sliding-block construction, replaceable slide plates, and longer shanks to protect the threads. A new form-fitting handle, designed to fit the hand, and the sturdy malleable frames, are said to lengthen the life of these cutters, which are available in four models for pipe from $^{1}/_{8}$ to 2 in. *Toledo Pipe Threading Machine Company, Dept. RLC, 1445 Summit st., Toledo 4, Ohio.*

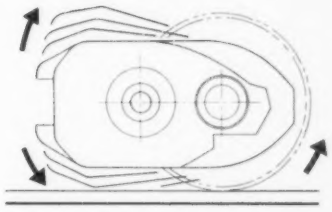
## Nylon Tie Speeds Wire Bundling

The Ty-Rap, tie molded of 101 Zytel nylon, permits the tight binding of harnesses, bundles, or groups of wires faster than the present method of string tieing, without slipping or relaxing or damage to wire insulation. It is slipped under the wire bundle and its knurled tip brought around and pulled through a hub at the opposite end of the tie. A simple installing tool automatically cuts the Ty-Rap

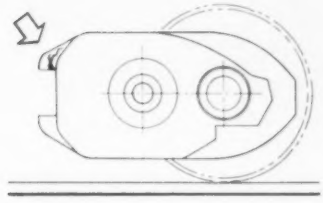
(*Continued on page 14*)

A NEW IDEA IN TRACTION MOTOR PROTECTION –

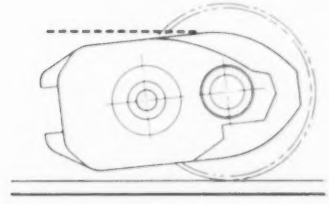
# LORD traction motor nose supports



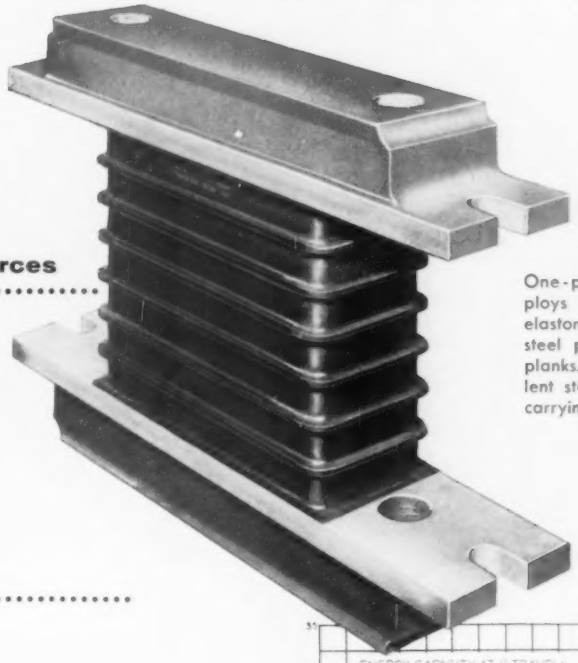
**cushion damaging shock forces**



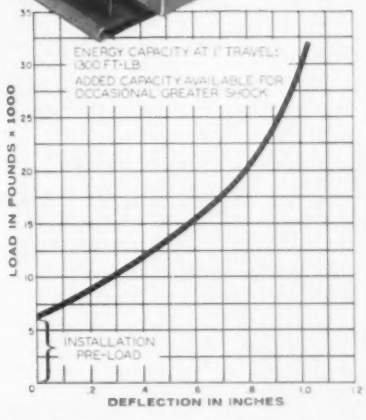
**end motor nose lug failure**



**assure non-sagging support**



One-piece construction employs specially compounded elastomer bonded to multiple steel plates and two spring planks. Design provides excellent stability and high load-carrying capacity.


ENERGY CAPACITY AT 1" TRAVEL: 1300 FT-LB
ADDED CAPACITY AVAILABLE FOR OCCASIONAL GREATER SHOCK
LOAD IN POUNDS x 1000
INSTALLATION PRE-LOAD
DEFLECTION IN INCHES

Stiffness characteristics of Lord Nose Supports increase gradually, permitting smooth absorption of all road shocks and torque impulses.

Here's the answer to costly maintenance of locomotive traction motors caused by heavy wheel-to-rail shock.

LORD Traction Motor Nose Supports effectively cushion all damaging reactions during sudden load changes, slip-grab conditions and reverses. Using the excellent shock absorption properties of rubber in compression, the high-strength bonded rubber units give full protection against even the heaviest shock loads. No solid "bottoming" is possible. And destructive vibrations are controlled.

Installed pre-compressed, they always provide positive energy absorption and overcome the problem of sagging supports. Long service life is insured by custom-compounded elastomer. No maintenance is required other than possible replacement of wear plates.

Designs are available for economical replacement of traction motor nose supports on all makes of diesel-electric locomotives. For additional information on this and other products for railroad application, call the nearest LORD Field Engineer or the Home Office, Erie, Pennsylvania.

LORD
BONDED RUBBER

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DAYTON, OHIO - BAldwin 4-0351
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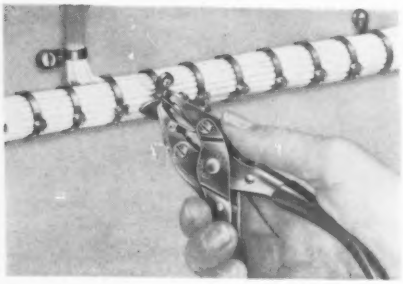
**LORD MANUFACTURING COMPANY • ERIE, PA.**

# WHAT'S NEW IN EQUIPMENT—*Continued from page 12*



to proper length and locks it in place.

Another Ty-Rap of similar design has self-clinching teeth in the hub. When the tip of the self-clinching Ty-Rap is inserted through the hub and pulled tightly, the teeth prevent it from withdrawing or loosening.

The Ty-Ray weighs only $\frac{1}{35}$ oz, can accommodate wire bundles from $\frac{1}{16}$ through 1¾ in. in diameter, and can support up to 30,000 times its own weight. It is available in milky white, red, blue, yellow, brown, green or black for color-coding applications. *Thomas & Betts Co., Dept. RLC, 36 Butler st., Elizabeth, N. J.*

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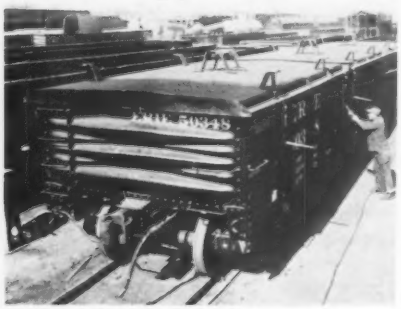

## Gondola Car Cover

A tri-section "flat top" corrugated-steel cover for gondola cars provides full weather protection for steel bars, sheets, forgings, etc., usually transported in open cars. Republic's original hood-type cover protects coiled steel stock.

The new cover protects flat loads, or those that can be palletized or unitized and handled by sling. It is in three sections, for partial or complete loading, and lies flat across the bulb channels of the car, where it is positioned by centering pins and sealed with load binders, or other clamping devices. The covers, fabricated from corrugated steel for stiffness and strength, fit any standard-width gondola, 40 to 52 ft long. A lip at either end of the center cover overlaps the adjoining end pieces, keeping weather out. Steel lifting brackets on each section permit center grab by C-hook or chain sling. Steel brackets at the edges of the cover permit stacking. First applications are being made on the Erie. *Berger Division, Republic Steel Corporation, Dept. RA RLC, 1080 Belden ave., Canton 5, Ohio.*

## Cutout Cocks with Teflon Coated Keys

The Teflon coating on the permanently lubricated keys of these improved cutout cocks is chemically inert and not subject to corrosion. It never dries or gets carried off through the system like conventional lubricants. Because of its relative softness and cold flow characteristics, the coating conforms to slight irregularities which might otherwise cause leakage, thus maintaining the sealing ability at mating surfaces throughout a longer service life. Foreign material is readily sloughed off in the course of normal operation because of the smooth, grease-free surface of the keys. Damage resulting from forceful operation of sluggish valves is eliminated because of the much lower operating torque exhibited by the permanently lubricated keys throughout their position range. *New York Air Brake Company, Dept. RLC, 230 Park ave., New York 17.*

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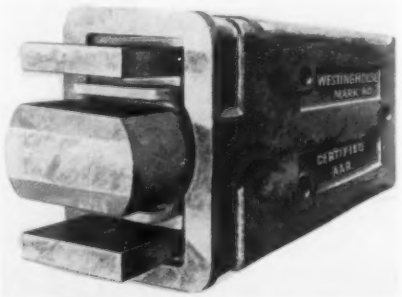

## Friction Draft Gear

The Mark 80 friction draft gear, now available for the alternate standard 36-in. draft pockets in freight cars, has been conditionally approved by the AAR Mechanical Division. It is said to give several times more protection than the 24 ⅝-in. pocket gears. It is constructed of alloy steels and has an official capacity of 77,320 ft-lb at 4.39 in. of travel with 447,000 lb of reaction force. *Cardwell Westinghouse Company, Dept. RLC, 332 S. Michigan ave., Chicago 4.*

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## Combination Vise and Stand

The 7C vise stand with chain vise, ⅛ in. to 5 in., and the 7Y with yoke vise, ⅛ in. to 2½ in., recently added to the Toledo line of pipe tools have sturdy steel folding trays that prevent collapsing. The large tightening handle is on top of the 7C, and compound leverage is applied to chain that falls into lever hook automatically, requiring minimum turns on screw. Either model can be converted from chain to yoke, or yoke to chain, with just a few additional parts. The large vise bases have three pipe benders located

over the rear leg, preventing tipping when bending pipe. Rubber grommets in the feet prevent creeping. Both vise stands are light, easy to carry and set up. *Toledo Pipe Threading Machine Company, Dept. RLC, 1445 Summit st., Toledo 4, Ohio.*

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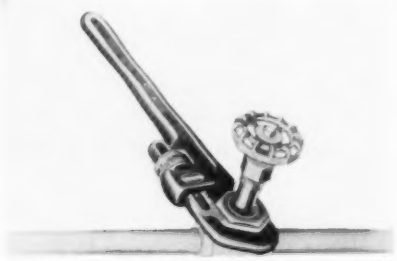

## Hex Wrench

A new Ridgid hex wrench has an adjustable four-sided jaw that is easy to put on or take off. Angular jaw design is said to give more leverage plus time-saving, positive grip on hex nuts, square nuts, valve packing units, unions and gas cocks, rough or finished. Narrow jaws make work easy in tight places.

The wrench, of heavy-duty construction, is available in three sizes—No. 11 for ⅜-in. to ¾-in., No. 17 for ⅝-in. to 1¼-in., and No. 25 for 1 in. to 2-in. nuts. The Comfort-grip I-beam handle of special malleable alloy has a hang-up hole. *Ridge Tool Company, Dept. RLC, Elyria, Ohio.*

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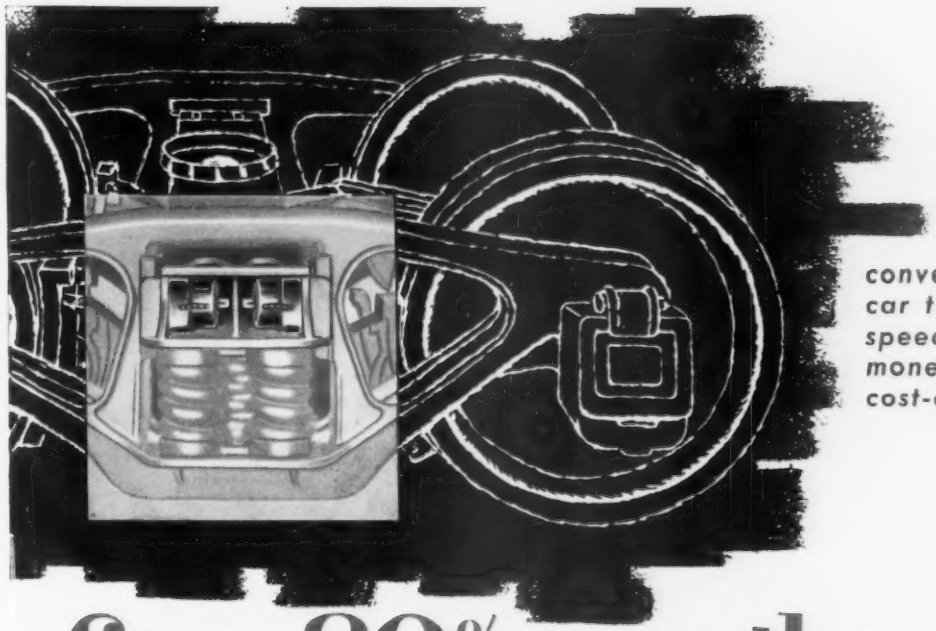
## Flood Lamp

The Fluomeric lamp combines features of incandescent, fluorescent and mercury vapor lighting. It screws into an ordinary electric socket, requires no auxiliary equipment, and

(*Continued on page 16*)

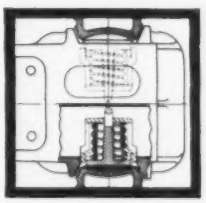


*convert old freight car trucks to high speed service this money-saving, cost-cutting way!*

# Save 80% over the cost of new Freight Car Trucks

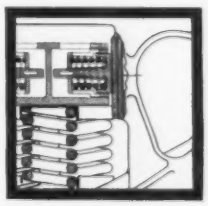
## *with the NEW HOLLAND RIDE STABILIZER RS-2*

NEW



New Large control spring for full face pressure, longer life.

NEW



New Center Retention Means for simplified assembling and dismantling.

There's no need to let those serviceable old Freight Car Trucks be limited to slow speed service when you can convert them to profitable operation at a fraction of the cost of new trucks... The Holland Ride Stabilizer RS-2 has proven to give the same high-speed, lading-protecting, easy-riding characteristics you get in new, costly freight trucks.

You can convert any bolster of A. A. R. approved design and stabilize the ride laterally, vertically and longitudinally... Installation of the RS-2 components is unusually simple... And Holland Engineers will give you on-the-job assistance. Write or call for the new Tell-All Bulletin RS-2.

## Holland Volute Snubber Springs

Either 2½" or 1⅜" Spring Travel.

STYLE E-2 Volute Snubber Spring, 2½" Travel in 50 Ton Group.

**Upgrades ride by introducing an unusually smooth snubbing action with an exceptionally high load carrying capacity. Holland's principle of utilizing the sliding action of telescoping radially compressed coils with ample friction area eliminates the "bombarding" problem.**

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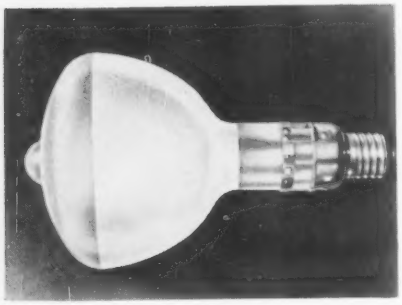
***for the finest in freight car truck controls!***

618

# WHAT'S NEW IN EQUIPMENT—*Continued from page 14*



attains full brilliance almost immediately. It has a hard-glass, heat-resistant outer bulb plus an extra-sturdy brass strap base.

It is manufactured in wattages of 450 and 750 and designed to burn 6,000 to 12,000 hr, yielding 30 lumens per watt.

To produce its light and color rendition, the Fluomeric combines a pure tungsten incandescent filament, a mercury vapor arc tube and fluorescent phosphors. They produce a full-spectrum golden-white light of high intensity.

In addition to multiple indoor uses, the lamp is recommended for outdoor installations. Requiring only the simplest open-faced reflector or hood, it is readily adaptable for flood-lighting. *Duro-Test Corporation, Dept. RLC, North Bergen, N. J.*

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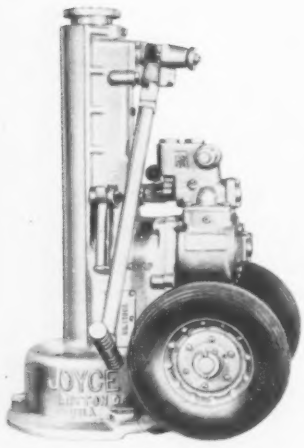


## Air-Motor Jack

A 25-ton jack, the 1725-R, is recommended for use in railroad repair shops. The model is available with toe lift. Equipped with trundling handle and large semi-pneumatic tires, the jack can be moved easily. Power is provided by a heavy-duty Ingersoll-Rand air motor.

The toe lift can be quickly slipped into place for lifting loads too low for the jack's standard lifting cap on top of the piston. The jack has spur gearing, anti-friction bearings, pressure lube fittings, automatic shut-off at top and bottom of rise, and positive safety controls.

Closed height is 28 in.; piston rise, 18 in., and weight, 245 lb. *Jack Division, Joyce-Cridland Company, Dept. RLC, 2027 East First st., Dayton 3, Ohio.*

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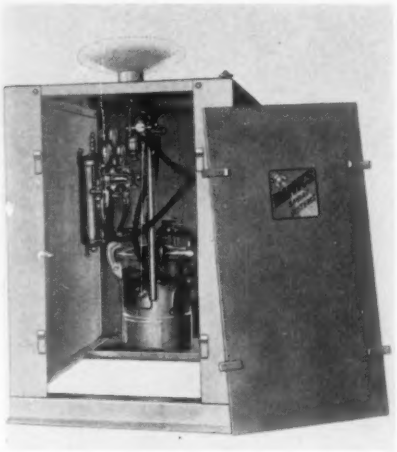

## Hose Coupling Servicing Unit

A compact unit for spraying rust preventive materials in the gasket grooves of air brake hose couplings said to eliminate rust in the couplings and prevent air leakage. The unit, is operated by placing the coupling over the spray gun on the top of the cabinet and pressing the spring loaded air valve. The spray gun delivers a circular spray of rust preventive into the coupling grooves.

The unit does not require skilled labor and the automatically controlled spray conserves material. It is a metal cabinet 24 in. wide, 34 in. deep and 34 in. high, containing a 2-gal pressure tank, air cleaner, air regulators and gages, adjustable bracket on which is mounted an air operated spray gun and spring loaded air valve. *Binks Manufacturing Company, Dept. RLC, 3122 Carroll ave., Chicago.*

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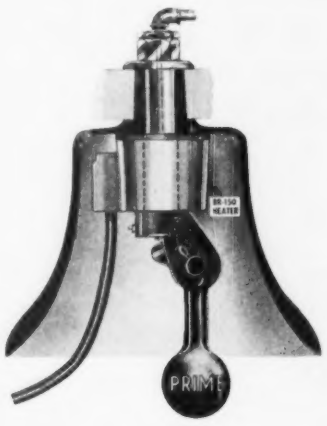
## Bell-Ringer Heater

The new Prime bell-ringer heater operates from 74 volts d-c and has a current draw approximating a 30-watt bulb. It will prevent air-line moisture from freezing in temperatures as low as 70 deg below zero. If a locomotive has been standing overnight, the heater will thaw the bell ringer in a few minutes.

This bell-ringer heater, Part No. BR-150, can be installed on any BR-106 bell ringer without the use of special tools and without removing the ringer from the bell. The heater slip fits over the stem of the bell ringer. *Prime Manufacturing Company, Dept RLC, 1669 S. First st., Milwaukee 4.*

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## Tool Truck

The KRD-340 truck for transporting tools can be moved up and down stairs while fully loaded. Two 10-in. diameter wheels and two 2¾-in. diameter front casters permit ease of handling, even in restricted areas. By pushing against a kick-plate at bottom rear of the unit and simultaneously pulling on the handles, the truck is tipped backward just enough to balance properly on the large rear wheels, then pushed to the job. By rolling the unit on all four wheels, it can be moved in and around machinery and other obstructions.

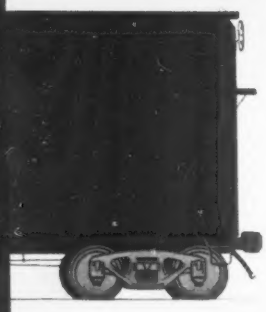
The truck is 39 in. high, 30 in. wide, and

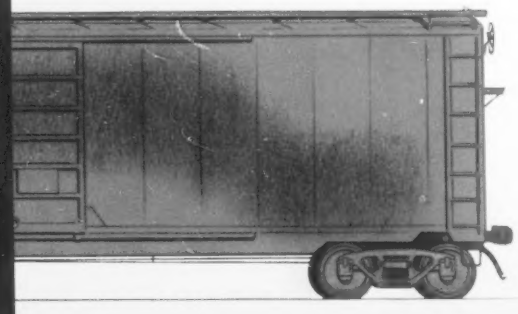
(*Continued on page 65*)

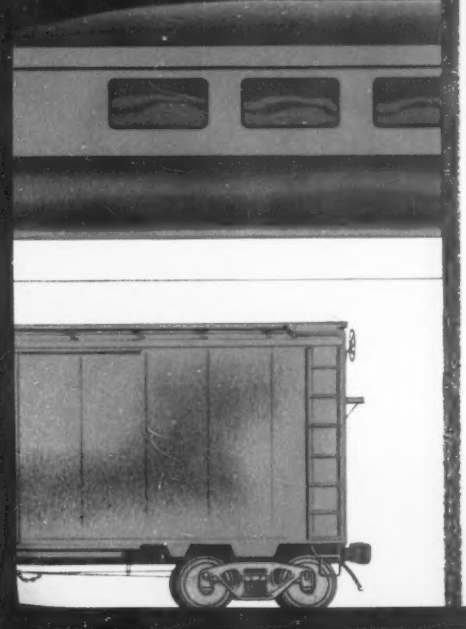
if
railroad cars
could write
testimonials,
they'd say...

# "IT'S THE ASF G

## Today's Modern Traffic Handling Demands Maximum Strength in Car Couplings







At American Steel Foundries, maximum strength in car couplings is taken seriously. So seriously, in fact, that absolute coupler *perfection* is taken for granted. As engineers in steel, we are constantly striving to *improve* on perfection . . . aspiring to make ASF Couplers (only ASF makes all four AAR-APPROVED designs) the safest links between railroad cars the world has ever known. This is the yardstick by means of which we evaluate ourselves. This is the motivating force that keeps our research and quality control people burning the midnight oil.

# GRIP THAT COUNTS!"

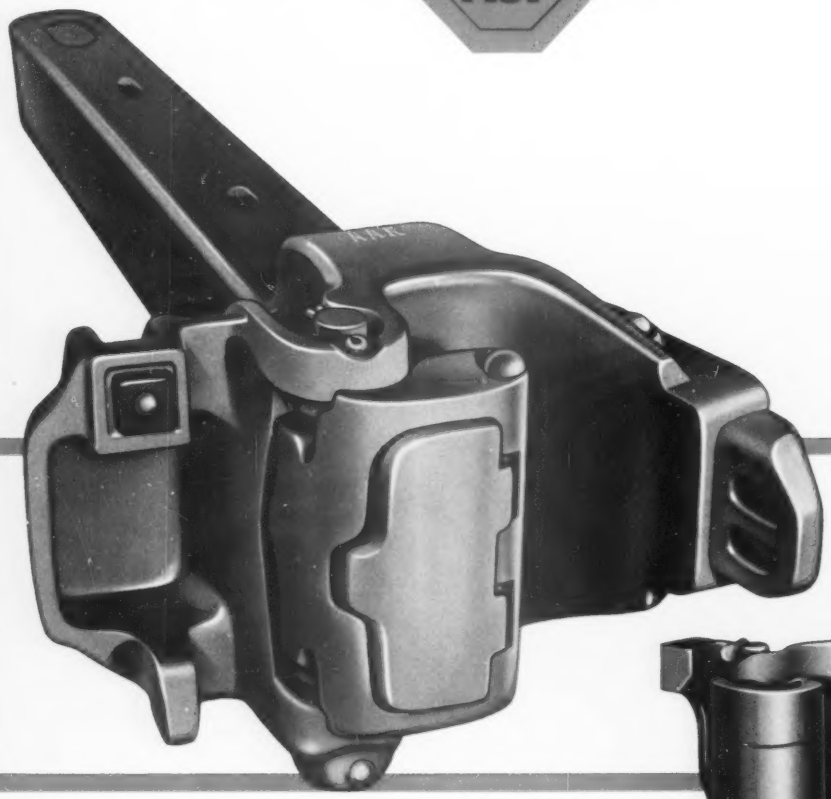
## ASF TYPE E COUPLER

This is the unmistakable standard for freight car service . . . now safer than ever, because of steady refinement that has kept pace with heavier drawbar pull. Accidental partings due to simultaneous longitudinal shock and vertical bounce are prevented by means of the Articulated Rotary Locklift. ASF Type E knuckle and lock are made of high tensile steel to give a yield strength of 300,000 pounds.

## ASF TYPE F INTERLOCKING COUPLER

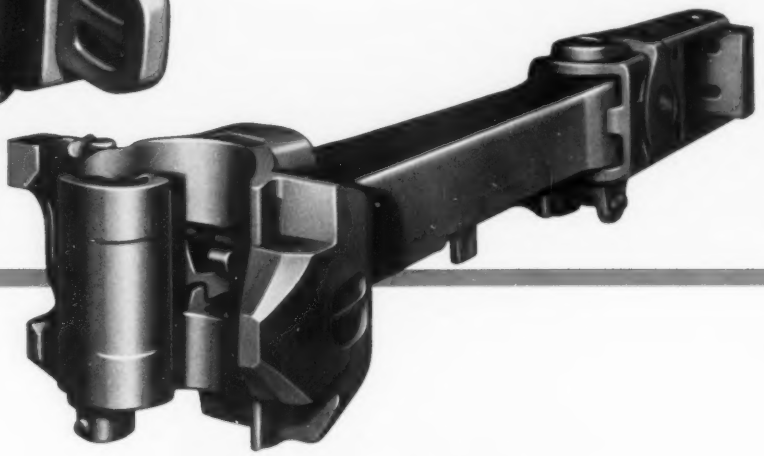
This AAR Alternate Standard freight car coupler provides passenger car safety at freight car costs! Lower maintenance costs add up to *another* "plus." Vertical movement between ASF mated F Couplers is virtually non-existent. This, combined with a more than 50% reduction in free contour slack, means less wear and shock stress . . . longer knuckle and contour life.

# "IT'S THE ASF GRIP THAT COUNTS!"



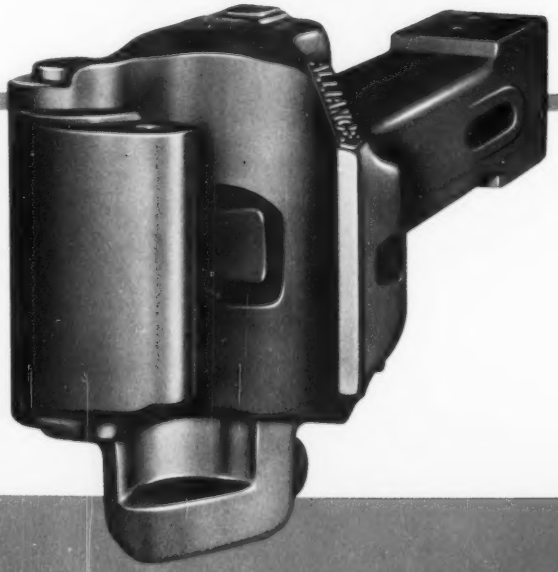
## ASF CONTROLLED SLACK COUPLER

Maximum safety and operational smoothness—combined with minimum cost—make this the ideal coupler for new passenger cars. ASF's Controlled Slack Coupler solves the problems of objectionable coupler noise and the shocks of free slack. It positively interlocks, both vertically and horizontally . . . and mates with all AAR Couplers, as well as older MCB Couplers.



## ASF TYPE H TIGHTLOCK COUPLER

The ASF Type H Tightlock Coupler is the premium coupler for passenger car use. Mating is unbelievably close, and stresses are distributed over a larger surface area, because ASF *machines* the components of this coupler to precision tolerances.



## ASF ALLIANCE INTERLOCKING COUPLER

This service-proved coupler offers railroads operating outside AAR interchange territory all the safety features of vertical interlocking. Dependable performance on thousands of railroad cars throughout the world attests its worth.

**AMERICAN STEEL FOUNDRIES**

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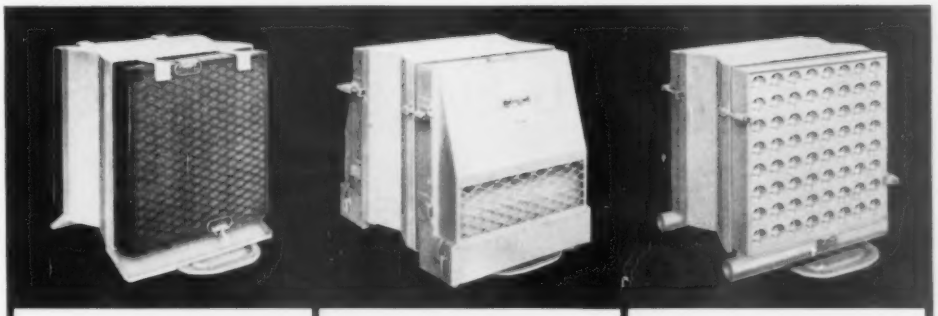
# FARR makes what it takes...

*the only complete line of air filters designed for diesel locomotives*



**IMPINGEMENT TYPE**

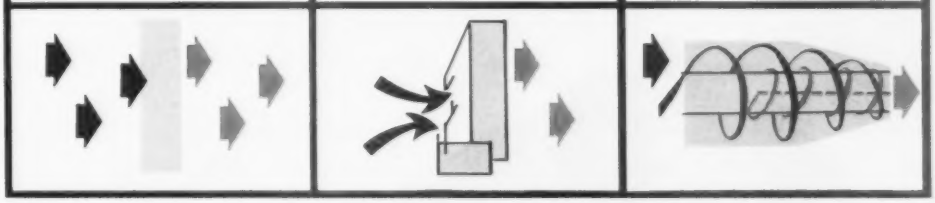
The Far-Air Type 44-68RH is the standard panel filter for engine intake air on most of American Railroads. Quality built to withstand the severe operating conditions frequently encountered in the railroad industry, this popular type offers efficient filtration, long service life, and simple maintenance.

**OIL BATH TYPE**

Far-Air Railroad Oil Bath Filters of the new "flat" design embody an entirely new oil bath control which assures full air scrubbing action at a lower resistance than the old fashioned cylindrical units. Designed to fit the filter adapters now in use on most locomotives, it eliminates costly modifications.

**CENTRIFUGAL TYPE**

Far-Air Rotonamic, a self-cleaning, cyclonic air cleaner, is made exclusively by Farr Company. Over 14,000 Rotonamic panels are now in service on American railroads. Available in field kits, which make it economical to upgrade to a maintenance-free Rotonamic installation. All major locomotive builders offer Rotonamics as original equipment.



This complete line of Far-Air railroad filters assures you the best in engine air filtration, no matter what type you may select. Farr Company has long experience in designing and building filtration equipment for railroads, in fact Far-Air filters now protect over 85% of all locomotives operating in America.

FARR COMPANY

CHICAGO LOS ANGELES NEW YORK

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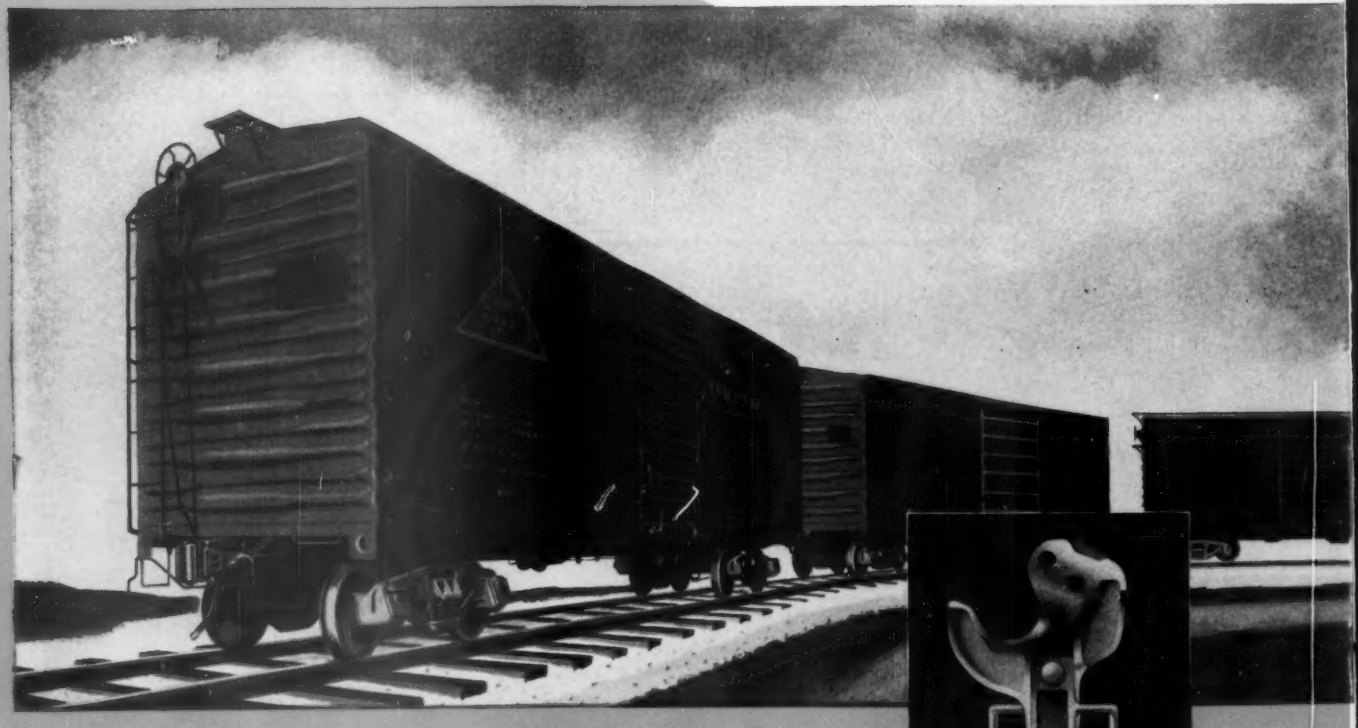

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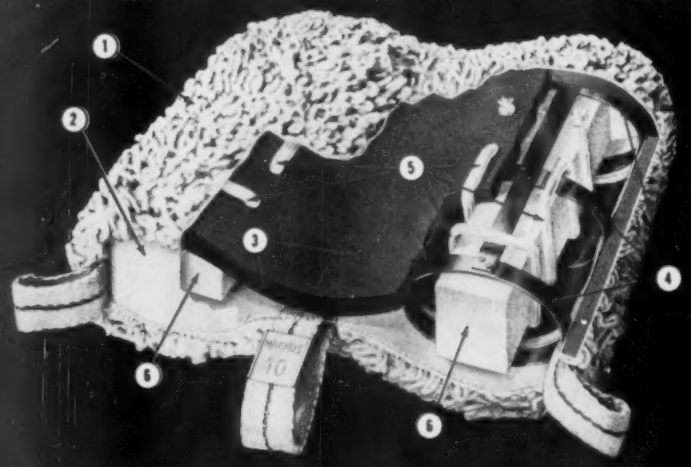


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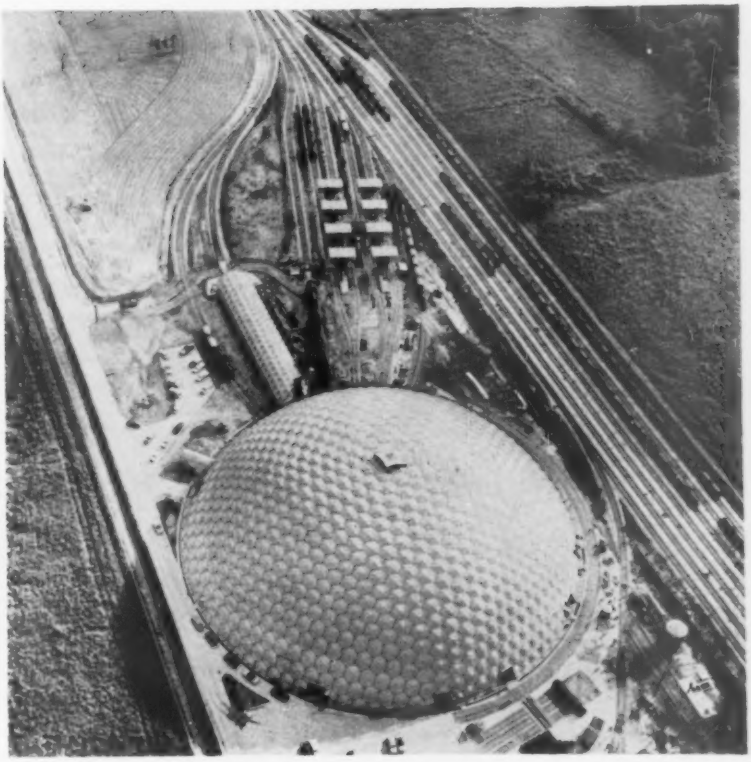
# Union Tank Builds Circular Car Shop

*Series of radial track work stations are housed in huge geodesic dome*



Dome exterior is painted yellow with tubular truss above these steel hexagons painted royal blue. Plant is designed to repair 200 cars per month. New cars can be assembled here.

UNION TANK CAR COMPANY "had to do this," as E. W. Locke, president, explained it. "This" is simultaneously a bold new concept for car shop layout and the unique structure in which the whole set-up has been housed. Just now this new tank car repair shop is going into full operation at Baton Rouge, La. It will be making repairs to approximately 200 tank cars per month. Already a second "Union Dome" with the same interior arrangement is under construction at Wood River, Ill., to replace UTC's present, outmoded, conventional car shop there. According to the UTC President, all important shops will be replaced in the same way over the next few years.

The very nature of tank car operation with its diversity of car types and the necessity for making individual and special repairs to each car which comes to a shop of the type at Baton Rogue makes a straight production repair line uneconomical. Even before Union Tank had adopted the Union Dome structure, it had been decided to lay the new car shop out as a modern-day variation of the traditional steam locomotive roundhouse.

High labor costs and the man-hours involved in handling and distributing materials and tools are such that every phase of the new shop design was aimed at moving the cars to work stations and having these arranged for maximum efficiency. Car repairs will be going ahead on one track while a car is being moved into the next. When the work is completed on the first track, the men move to the second. In almost every case, each track has a complete set of utility outlets, electrical receptacles and many tools. R. H. Lehr, plant manager, explains that it is cheapest to keep cars waiting and utilize all other facilities and the manpower full time if possible.

### Union Dome

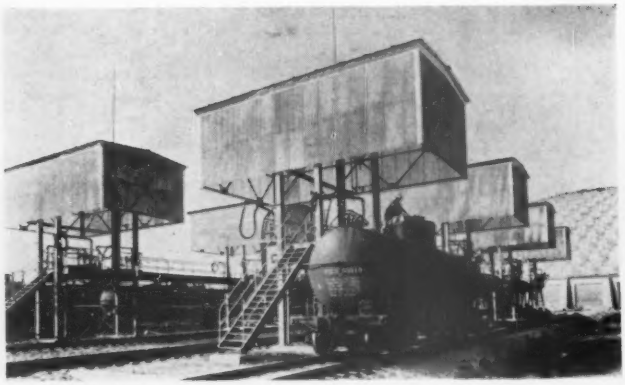
The Union Dome is the largest circular building (384-ft diameter) in the world without internal supports, and is the first geodesic and all-welded dome fabricated entirely of steel.

For the first time, all tank car repair operations have been put under one roof. As a car approaches the Dome, its exterior is cleaned at the *wash area* near the exit of the Paint Tunnel. If the car has carried liquefied petroleum gas or acid, it is cleaned at the special LPG rack. Upon entering the Dome, the car is inspected to determine what repairs are needed.

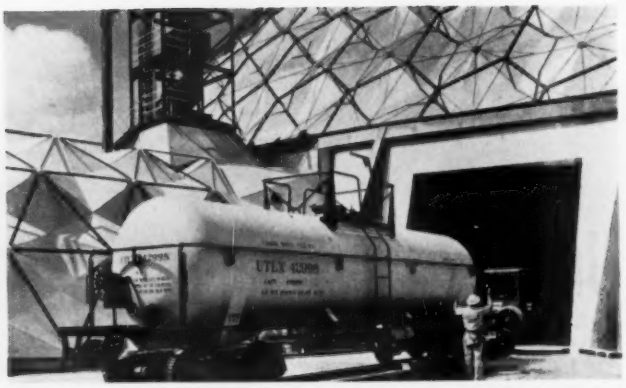
The car is taken aboard the transfer table and delivered to the assigned repair track position. All repairs to the tank car are made inside the Dome. The car may be moved from station to station via the transfer table through various repair stages.

When completed, the car is sent out on one of the three exit tracks. One track returns it to the storage area. A second outgoing track returns it to service. The third outgoing track leads through the Paint Tunnel, for those cars which need to be painted and stencilled.

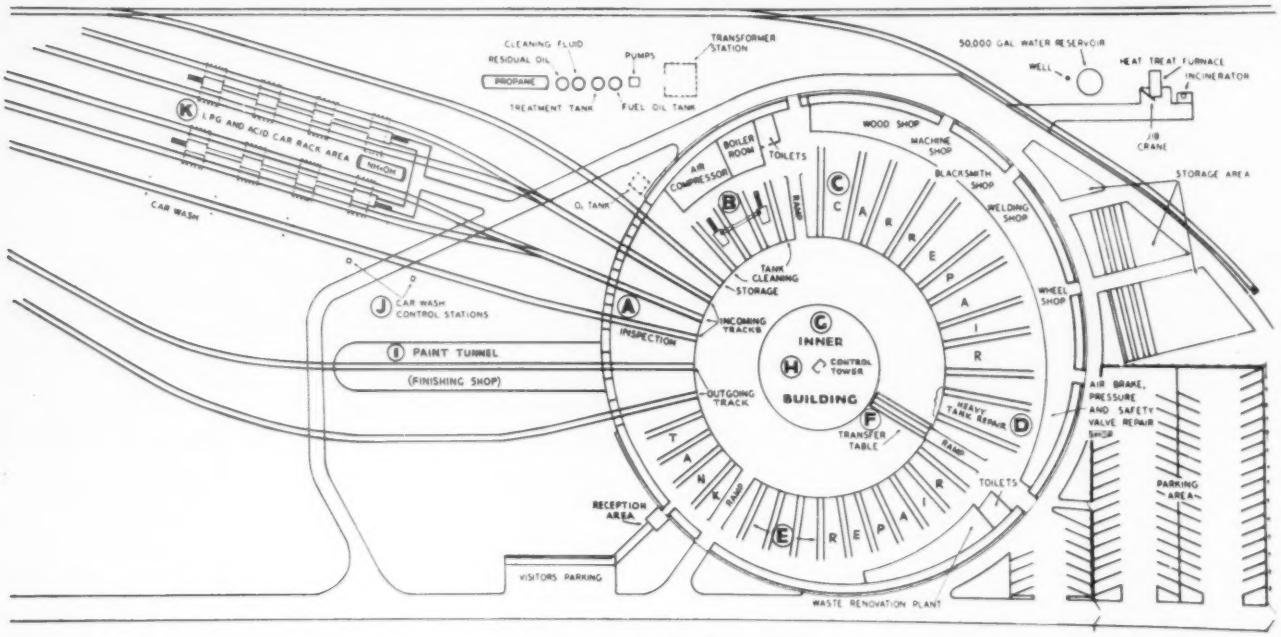
Inside the Union Dome are 36 individual specialized repair track positions, corresponding to the spokes of a giant wheel. These include four tracks for tank cleaning; ten for car repair; two



Cars assigned to LPG or acid service are cleaned with high pressure steam and special solutions before entering shop. On another entry track are spray nozzles which clean the exteriors of all cars.

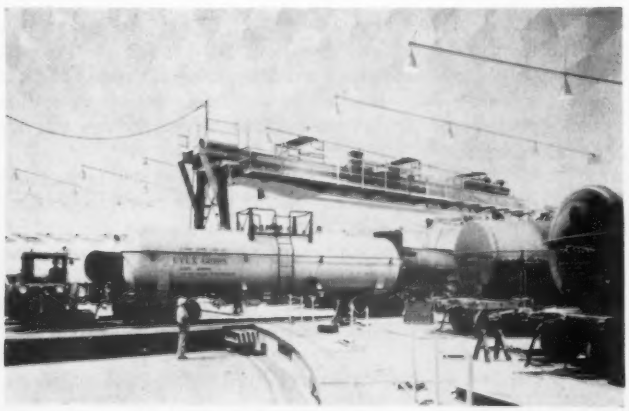


Switching of entire plant is done by Whiting Trackmobile here moving completed car out of shop. Dust collector at back is part of the Vacublast cleaning room at entrance to the "paint tunnel".

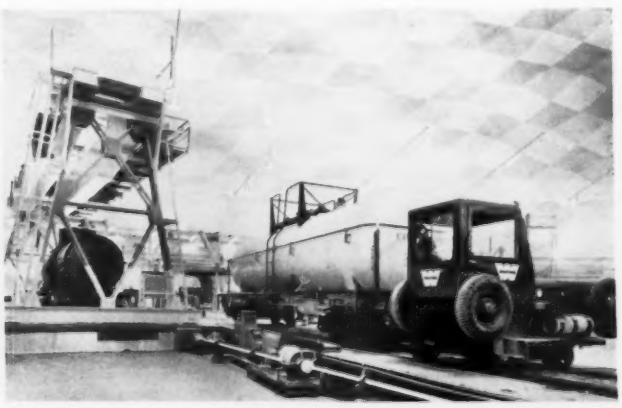



Track plan and maintenance and repair stations include:

(A) Inspection station for tank cars entering the Union Dome.
(B) Four tracks where insides of the tanks are cleaned.
(C) Ten tracks for general repair.
(D) Two tracks for heavy tank repairs.
(E) Fourteen tracks for general tank repairs.
(F) Transfer table.
(G) Inner building for materials storage and offices.
(H) Control tower, at top of Inner Building.
(I) Paint tunnel or "finishing" shop.
(J) External Car wash stations.
(K) LPG rack for special interior cleaning.



Transfer table serving 36 radial tracks moves in circular path around 100-ft diameter structure at center of shop. Combined with incandescent and fluorescent fixtures over tracks are indirect lights.



Heavy repair section has 30-ton gantry crane running across its 10 tracks. Each individual track has small gantry running along it. These small gantries have three hoists for truck dismantling.

for heavy tank repair; and 14 for tank repair. There are three incoming tracks, including one for inspection; and three outgoing tracks, including one which leads out through the paint tunnel. Each repair track holds one car. A Whiting transfer table, which also accommodates a single car, moves in a circular course around a circular interior dome structure on a path 50 ft wide. It delivers the tank cars to the various repair stations.

The second geodesic-type structure, 80 ft high and 100 ft in diameter is located 25 ft off center of the main Dome, but forms the hub of the giant wheel-like arrangement of tracks and repair areas. A control tower at the top of the interior structure provides visual control of all areas. Thirty-three telephone stations place a telephone within a few steps of every location in the plant.

The 2,160 ft of repair track with all repair areas are located within 50 ft of the materials storage area on the ground floor of the center structure.

Control tower at top of central structure is 80 ft over shop floor. Control of all operations and of material flow is handled from here. Stores facilities are at base of this structure and offices on 2nd floor.

### Interior Structure

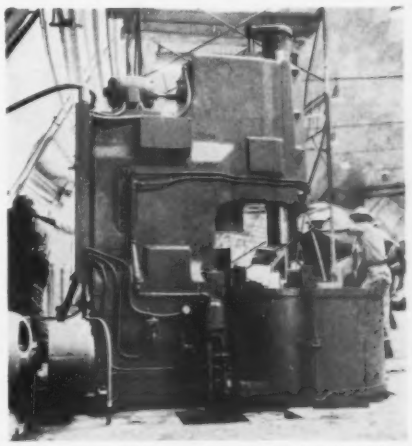
The interior structure is made of steel and concrete block and rises 80 ft to a glass-enclosed control tower. It has a diameter of 100 ft—encompassing 7,500 sq ft of floor area.

At the ground level is an area for materials storage. At a level nine ft above the storage area is an open-deck mezzanine and an enclosed office for storehouse supervisory personnel and the plant's extensive telephone dial system. The main floor of the interior structure is 18 ft above the ground level. It provides general administrative offices, a reception room and employees' dining, locker and shower facilities.

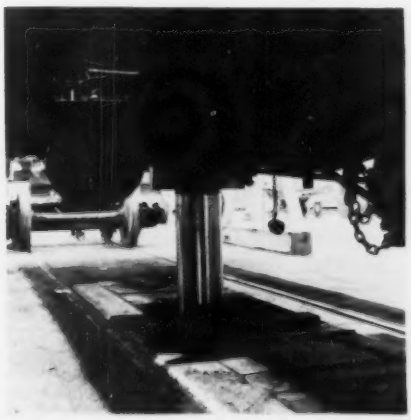
The glass-enclosed control tower is the nerve center of the tank car repair operations. It is the headquarters of the work-coordinator who is in touch with the inspection area and all tank car repair stations by telephone. Around the office inside the tower is a desk-height shelf divided into sections that correspond to those tracks directly below. By marking on the thick plastic surface of the shelf with a grease pencil, the work-coordinator keeps record of the status of work on each track. Changes in the notations are made by simple erasure.

Tank car inspectors relay the work that must be done to the work-coordinator, who in turn enters this information in a Friden Flexowriter Programatic system. The Friden machine has been adapted especially for car repair work, and is used by the work coordinator to maintain automatic programming, control and records of all repair operations, and order material from stores area.

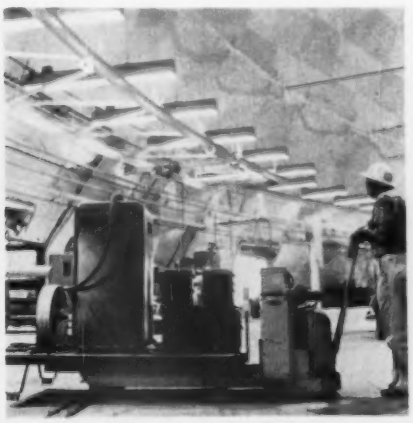
The Whiting transfer table is the key to the movement of cars in Union Dome's radial track plan. It carries only one tank car at a time, and travels on a circular course 50 ft wide around the interior structure. Tank cars are moved onto the transfer table by a Trackmobile. The driver of the Trackmobile operates the transfer table from his driver's seat.



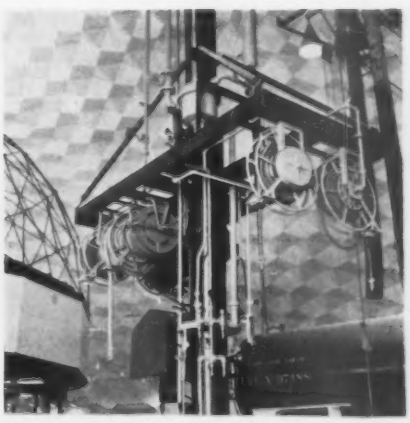
Niles car wheel borer is combined with Sellers axle and journal lathe, and 600-ton wheel press to produce compact wheel shop in one section of crescent-shaped area back of the car repair tracks. Shop steam is supplied by two Cleaver Brooks generators and compressed air is produced by Ingersoll Rand Type LXE compressor.



Movable 9-ton Autoquip jacks mounted between rails are used for lifting cars. Jack bears on underframe just back of the bolster.



Skid-mounted Lincoln rectifier welders are moved in shop by lift truck. Special shop trucks handle journal packing and the packing tools.



Retractable Ace hose and cable reels are located at each work station. Aim was to keep all hoses and cables off the shop floor.

**Paint Tunnel**

The Paint Tunnel connects to the main dome, and is 200 ft long, 40 ft wide and 20 ft high. It covers one of the outgoing tracks and is the last stop for those cars requiring painting and stencilling. A special Vacublast grit-blasting unit prepares the cars for painting.

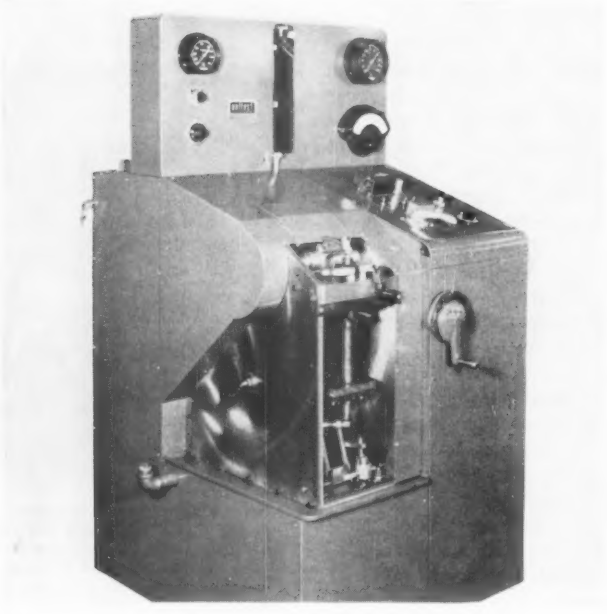
The next step is a pre-heated oven for controlled and quicker drying of the paint. At the paint area workers on both sides of the track have scaffold elevators which move up, down or sideways. Paint is applied at temperatures ranging between 130 and 160 deg F. The last stop in the paint tunnel is for stencilling, an operation which has been greatly facilitated by the use of magnets and a photographic slide projector. The overall operation in the paint tunnel can be done in two to three hours.

The Union Dome consists of 321 hexagonal steel panels welded toge ther and strengthened on the outside by an interlocking system of rods and pipes. There are 12 slightly different shapes and sizes of panels, averaging approximately 30 ft across.

In technical language, the Dome is approximately a one quarter sphere, de-

(*Continued on Page 62*)

# More Accurate Calibration for Fuel Injectors?



FUEL INJECTORS are the "heart" of the diesel engine, and present methods of checking overhauled injectors may not tell everything about how they will actually perform in service. In general, the hand-operated test device, now widely used, does permit observation of the spray pattern and checks the "pop" or opening pressure. It does not give a check of the quantity of fuel delivered. There is no "run-in" or "settling down" of valve alignment in relation to the pressure spring to assure proper seating. This may cause some initial fuel leakage when injectors are installed and the engine first placed in operation.

As a matter of fact, a recent accurate calibration of injectors overhauled and hand tested by the usual methods at a western railroad shop showed variations of as much as 10 per cent in fuel delivery by individual injectors at full load, 50 per cent when idling, and a leak-off four times as much as one injector as on several of the others. The device used for this test was the Unitest U-8500 comparative calibrator which has been developed by the Diesel Control Corporation, Wilmington, Calif., especially for checking GM Electro-Motive and Cleveland diesel fuel injectors.

The tester simulates the operation of an injector in a diesel engine by holding it in operating position from a bearing point on the assembly sleeve, and compressing the injector as it is when installed in the engine. A standard Model 567 rocker arm and cam contour are used. The speed (operating range) is from 250 to 900 rpm. The temperature of the calibrating oil is controlled and the oil is circulated at a constant pressure.

To assure accuracy in the machine there is a flywheel with sufficient inertia to maintain a steady rate of plunger travel. The stroke counter (regulating the number of injections discharged to the measuring graduate) is exact; the graduate which collects injector discharge is of commercial accuracy; and the dumping action is time-controlled in order that the residue from "wet glass" will remain constant.

A volumetric check of actual fuel delivery, under controlled conditions shows whether or not: (1) each stroke of the injector under test will deliver fuel in quantities compatible with other injectors repaired by the same method; (2) all parts of the assembled injector are in satisfactory operating condition and that incorrect parts are not installed; and (3) used parts, visually inspected, are satisfactory for continued use. In addition to this proof that the final assembly of an overhauled injector is correct and satisfactory and that no dirt remains in the injector, the injector is "run-in" and conditioned to perform immediately and satisfactorily when applied to an engine.

Considerable use has already been made of this machine in testing injectors used by railroads. Such items as leakage across flat surfaces, sticky plunger and barrel assemblies, and oversize tips are easily detected. The machine is in effect a *Go—No Go* gage for fuel injector repair work.

Present testing time with the Unitest machine is under 6 min. per injector to run a calibrating check involving two speeds and two rack settings, but this time may be reduced when more shop experience has been gained with a larger number of units. Improved diesel engine performance, fuel savings and reduced maintenance are strongly indicated by the use of this calibrating machine which gives a positive check of the quality of injector repair work and thus assures more equal delivery of fuel to each cylinder of a diesel engine.

Accumulations of cement on the roofs and running boards of cement cars increase the light weight, make the hatches difficult to operate and close tightly, and frequently result in customer complaints.

*Again It's The Season . . .*

# To Keep Your Covered Hoppers Clean

WHILE COVERED HOPPERS have been used to haul many new types of loads in recent years (RL&C, October 1958, page 24), most of these cars still handle cement. In fact, the growing use of ready-mixed concrete and the national highway program both point to the need for more and more of these cars in the years ahead. Increasing numbers of the cement industry's customers want their cement by the bulk carload rather than in individual bags.

What does this mean to railroad mechanical departments? It means that instead of demanding box cars with tight roofs and reasonably smooth interiors, these shippers now place the emphais on covered hoppers with hatches and outlets in good working order, and with roofs and interiors free of any build-up of dried cement.

Accumulations of cement increase the tare of a car between the mandatory lightweight periods and are frequently the source of arguments with shippers. Present day cement specifications are much more rigid than was formerly the case. Customers will not have cement of one specification contaminated by the material remaining in the car from a previous load.

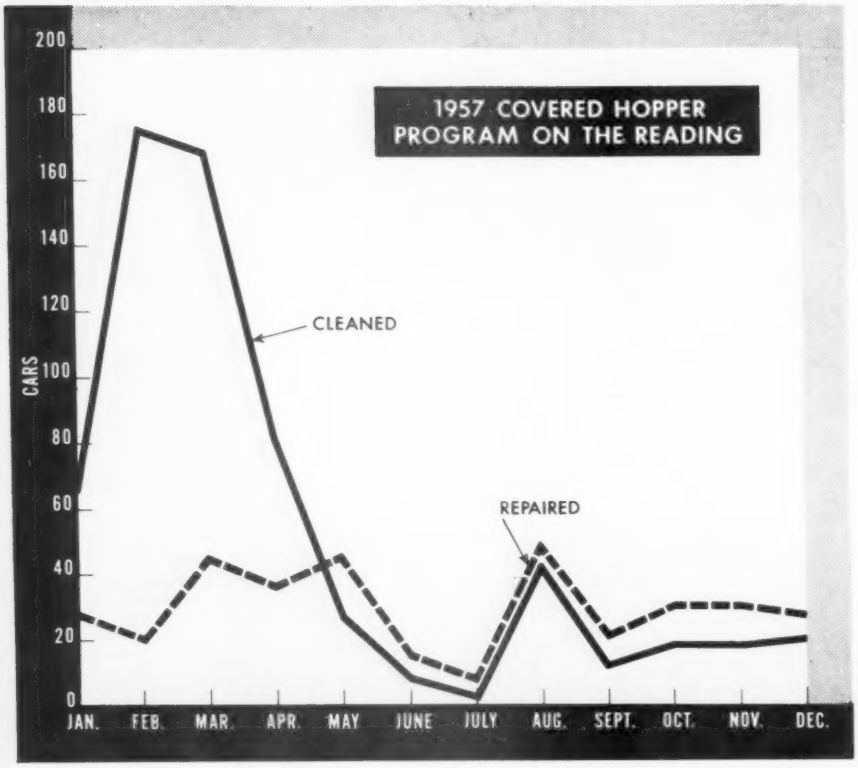
Most mechanical men are quick to point out that accumulations of cement, least on the roofs of cars, could be kept down if the men who load the cars would blow or sweep the roofs after loading is completed. But that idea in practice is about as effective as those for getting consignees to remove dunnage or replace DF loader bars after unloading a car. The problem gets back to the mechanical department and probably can be approached from two angles:

- Can covered hoppers be designed or coated so that cement will not build up?
- What is the most efficient way to remove accumulations of dried cement?

*Railway Locomotives and Cars* surveyed most of the major cement hauling railroads. On questions of design, most lines agree that the round hatch and cover are vastly superior to the square hatch used on earlier cars. As one SMP put it, "With the square hatch and cover, the cement would more or less stay on the top of the car, and become caked . . . With the round hatch and cover, it is more likely to be blown away when the car is in motion, and not cake."

This circular hatch is endorsed by one of the nation's big cement shippers with the statement that there is less spillage in loading and that these covers stay tighter. One railroad reported that its specifications for covered hopper cars are prepared "in an effort to reduce edges, corners, and ledges to keep the build-up to a minimum." This road's cars are to have round hatches, inside seams, raised running boards, rounded eaves, and as few sharp corners and fillets as possible.

Some railroads have been experi-




Cement car cleaning program of the Reading is concentrated in the winter months as shown by the road's 1957 figures. these cars are cleaned on an outside track at the Reading, Pa. shop.

menting with a wax coating on the interiors of covered hoppers and others with a plastic material to keep the cement from adhering to the car. One road has been testing a plastic coating for the roofs. It is the intention that this material would be stripped off once the roof had become coated with cement. One road reported on the coating of the interior of a car, but said that the procedure was "quite expensive" and that the car was subsequently assigned to salt service.

Archer-Daniels-Midland reports that its ADM Freight Liner 610, a strippable plastic coating, is being marketed to railroads following a year and a half of testing on the Clinchfield. The material is a one-coat sprayable plastic with good alkali and weather resistance. It does not require a catalyst but dries by solvent action. According to ADM, the Union Pacific, Santa Fe, Great Northern, Frisco, Wabash, Pennsylvania, Soo, and Texas & New Orleans also are using the material.

ADM Freight Liner 410, a material used previously for coating the interiors of food products cars, is being tested by the Frisco as a permanent coating for cement cars. The material's resistance to abrasion, moisture, and chemicals is expected to produce a smooth, fast-unloading, easily cleaned, surface to which cement will not adhere.

### Cleaning Schedules

The ultimate in cleaning methods was probably achieved a few years ago when one shop track attempted to loosen crusted cement from the interior of a covered hopper with dynamite. The car came off second best, and more conventional cleaning methods again became the standard at that shop.

Even these "more conventional" methods vary from road to road. Costs probably don't, and run from $25 to $50 per car. This varies not only because different methods are used but also because some cars are operated for longer periods between cleanings.

Both costs and timing were mentioned by one mechanical superintendent who reported that "we have no specific program set up for cleaning these cars. It is a terrifically expensive operation and, consequently it is performed only when it is absolutely necessary."

Another approach was reported by W. E. Lehr, superintendent of motive power, Lehigh Valley. "We have set up an inspection program for our inspectors at interchange and intermediate points to check these cars for cement accumulation and to see that the hopper doors are in operating condition. Periodically, these cars are sent to our Packerton Shop where the caked cement is completely removed, and loose cement cleaned from both the outside and the inside of the car. There have been a number of complaints about the weight of the car affected by the caked cement and this is another reason why we have to bring the cars to the shop regularly.

"We have established a regular program," Mr. Lehr continued, during the winter months when the demand for cement cars is at a minimum to bring all these cars into our Packerton Shop for cleaning. After this, they are stored, awaiting the opening of the shipping season in the spring."

Another road reported that the covered hoppers are cleaned and reweighed every second year. This procedure is said to permit an annual program without taking too many cars out of service at one time.

### Cleaning Methods

Sandblast and chipping hammers are generally conceded to be the most effective ways to remove the stubborn deposits of cement which accumulate on covered hoppers. F. J. Black, supervisor of motive power and equipment, Northampton & Bath, reported that this road does two types of cleaning. "One is a complete strip-down job in which all the paint is revoved and the car repainted. The other is a cleaning of the accumulated cement on the roof of the car, the repairing of the hatch covers, and the cleaning and repairing of the hopper doors.

"In the complete strip-down," Mr. Black went on, "the metal running boards are removed and the car is sandblasted with a Pangborn Sand Blaster. The car is cleaned down to the bare metal both inside and out, and then is repainted. The other cleaning is more the removal of rough cement which accumulates on the roof. This is done with chipping hammers and by hand. This is a rough type of work and is used mostly to bring the car back to the marked light weight. Our cars are cleaned for light weight by the second method when inspection shows it necessary."

The Lehigh Valley, Jersey Central and Reading all report the use of a device known as the Airnesco Pulsair percussion generator which "is small enough to be used as an air gun". W. E. Lehr, of the Lehigh Valley reported that the Airnesco unit has been found "efficient and entirely satisfactory for cleaning the car—saving time and labor compared with the old method of chipping off cement with hammer, chisel and bar."

The Jersey Central stated that the latest Airnesco unit "can be used with

a connection for sandblasting. The sandblasting thoroughly cleans the car to facilitate the welding of small cracks." The Jersey Central has a special air line on one track in the Allentown, Pa., yard "which makes it convenient for employees to work on the roofs. The Airnesco machine does a very good job in loosening the hard, caked substance without damaging the roof sheets or hatch covers."

On the Reading, W. A. W. Fister, superintendent of motive power and rolling equipment, says the Pulsair gun has materially speeded up the cement car cleaning program. "However, its value is greatest as a supplementary tool and does not handle all the cleaning required—especially in the areas around the hatches where the build-up is the greatest and appears to be the most tenacious.

"In these areas, we are required to loosen this build-up or incrustation with an air hammer and then use the Pulsair gun to remove the residue," Mr. Fister explained. "Once the pulsing air can get under the material, it will remove it very quickly. The biggest time and labor saving with the gun is in the cleaning of inside surfaces which previously was done by hand. It formerly required ladders and scaffolding inside the car. With an extension, the Pulsair gun removes 90 to 95 per cent of the cement on the inside from the outside through the hatches."

The growing popularity of covered hoppers for transporting industrial chemicals, grain, and other materials frequently makes it necessary to clean cars twice a year. A number of roads have found that cars used for cement service in the summer can be assigned to other services during the winter. One line reports that, in addition to all mechanical methods, hand cleaning and water pressure will be required for such a complete cleaning of this type.

Whether used exclusively in cement service or not, the cleaning of these cars continues to be a vexing problem for car department officers. Design can help some, but at the moment efficient cleaning tools are the most obvious answer. In any case, cost will continue to be high.

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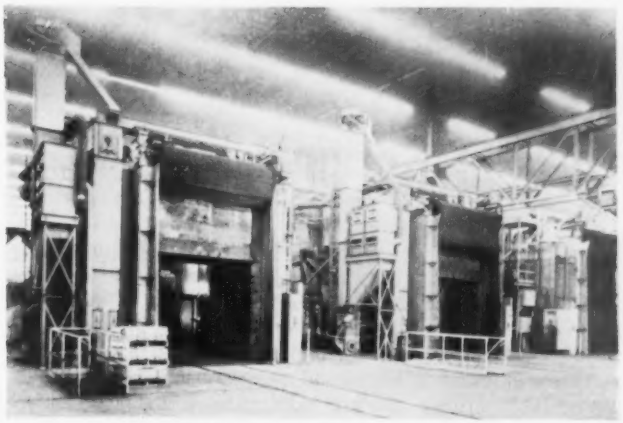
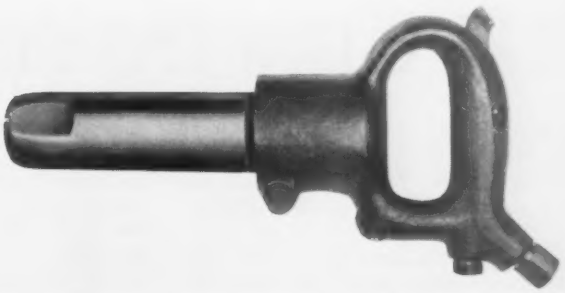
# These Devices Might Solve Your Cleaning Problems

Chipper, Chicago Pneumatic Model CP-455-L, is equipped with jet for cleaning work surfaces. The manufacturer recommends that it be used with Heavy-blade Chisel 70982 for removing stubborn cement deposits.



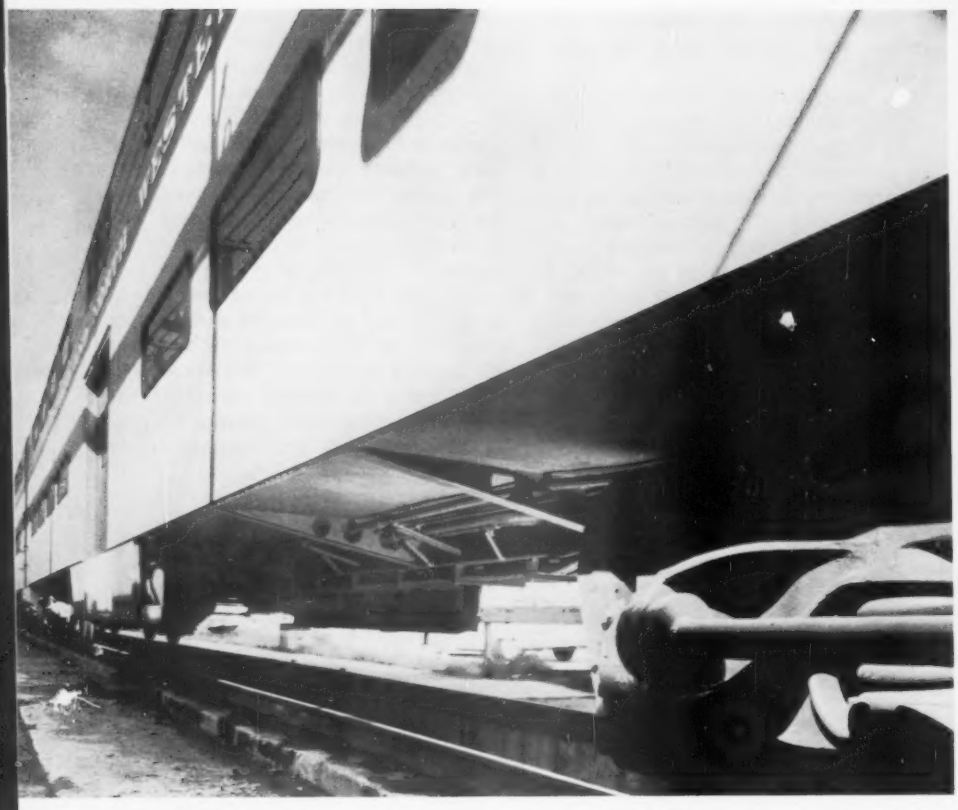
Airless centrifugal Rotoblast cleaning rooms are recommended by Pangborn Corp. for car cleaning. This company also makes airblast equipment which could be used for interior cleaning.



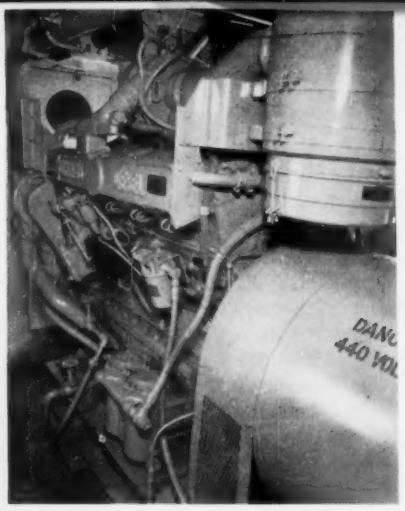
Chipping and scaling hammers, such as this unit produced by Gardner Denver Co. do fast thorough cleaning job on covered hoppers according to the manufacturer.

Airnesco percussion cleaning system, made by L. C. Nesham Products, includes Pulsair gun whch can be used as sandblasting equipment with interchangeable parts available.

Von Arx pistol, sold by Marindus Co., has battery of hardened steel needles which are forced against even irregular surfaces to remove residual cement which air exhaust clears from work area.



Head-end electric power for heating, air-conditioning and lighting, plus unit brakes, eliminates under-car generators, piping and rigging.



Alternator installation on this diesel locomotive added only 6,200 lb to locomotive weight.

Bi-level lounge car has 13 theatre-type seats at small tables on the upper level.

# C&NW Bi-Level Streamliners Are In Service

TWO NEW CHICAGO & NORTH WESTERN streamliners, just going into service, are the first bi-level trains in America for through service. Interesting car designs have been combined with other mechanical and electrical innovations on these trains. For $2,500,000, Pullman-Standard constructed 13 new cars of the bi-level design and remanufactured four conventional cars to conform in exterior appearance with the new cars.

The 85-ft bi-levels have the same structures and center vestibule entrances as the 48 double-deck suburban cars the C&NW already has in service. In fact, these new cars could rapidly be converted for suburban service, if that ever becomes necessary. "This new design," according to Pullman-Standard president J. W. Scallan, "represents a giant step forward in the reduction of weight and cost in passenger equipment with no sacrifice in comfort or spaciousness."

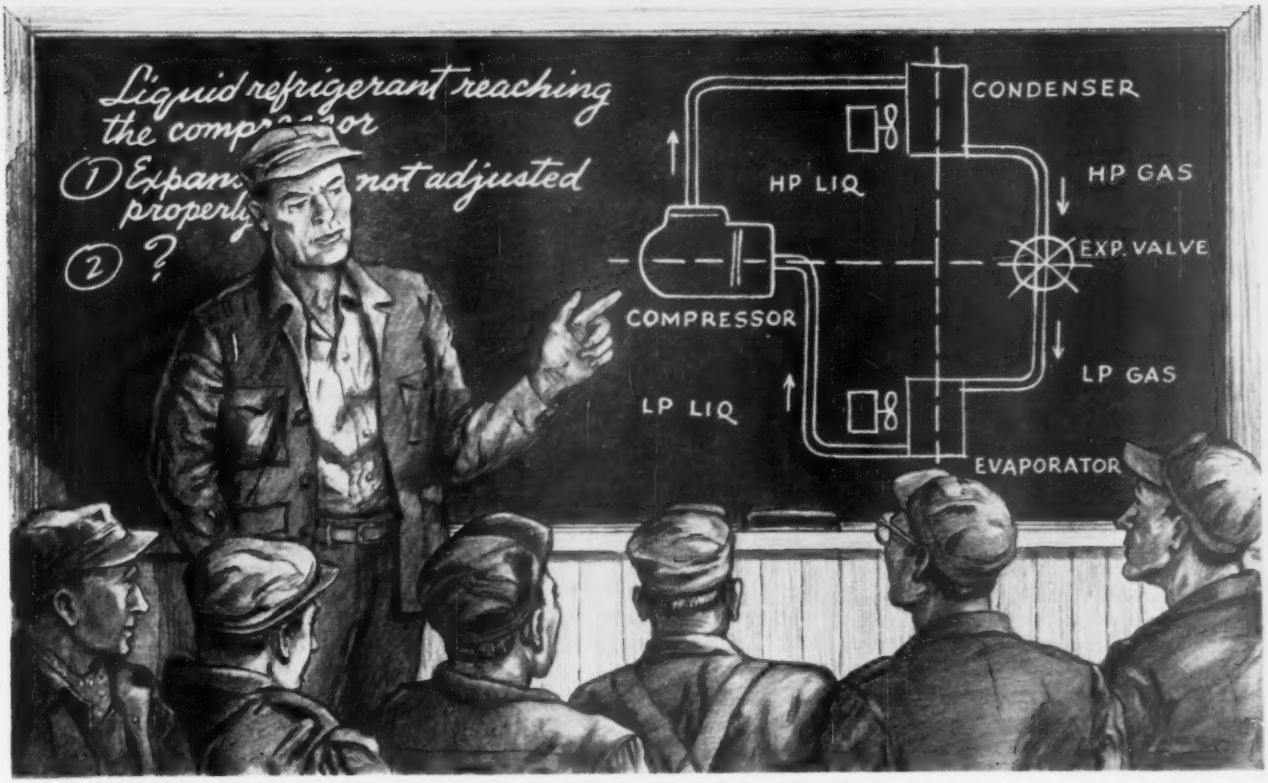
Ten of the new cars are 96-seat coaches with 16 seats on each of the two upper levels and 32 on each of the two lower levels which are separated by the center entrances. These coaches weigh only 1,302 lb per passenger seat —a figure competitive with some of the lightweight trains put in service in recent years. In addition to the 10 bi-level coaches, there is one bi-level, 60-passenger parlor car; one bi-level, 78-passenger coach-parlor car; and one bi-level, 80-passenger coach-bar-lounge car. The remanufactured single-level cars include one baggage-tap car, one baggage-ROP-tap car, and two diners. These remanufactured cars had their roofs raised to 15-ft 10-in. above the rail to conform with the profiles of the bi-levels.

The power for the new trains is to be supplied from the locomotives—an arrangement which gained popularity during the most recent lightweight train era. The C&NW shops have converted six locomotives for this. Four GM E-8's and two F-7's have each been equipped with a 575-hp Cummins engine, driving a 300-kw, 480-volt, 3-phase Marathon alternator. Power from any two of these locomotive units is sufficient to power the longest of the bi-level trains. On the E-8's, the steam generator and most of the associated wiring and piping were removed. The diesel and alternator which were installed are skid-mounted to facilitate removal.

On the E-8's, the boiler water tank was connected with the 1,100-gal. fuel tank and the new fuel storage system has a total capacity of 2,200 gal. Fuel consumption of one of the auxiliary engines at full load is 35 gal per hr. Locomotive weight is increased by 6,200 lb with this all-electric power supply equipment.

Automatic equipment for the paralleling of two or more alternators is installed on each locomotive. The three-phase a-c train line through the cars makes possible the use of some commercial electrical equipment such as water coolers, water heaters, and fluorescent lights. Resistance-type units located along the side walls and in the

(*Continued on page 64*)




"But still liquid refrigerant is reaching the compressor"

# Frosty But Not Freezing

**By Ken Wright**

ONE MORNING, the gang gathered in the room used for the mechanical refrigerator car discussions. Pete, our grumbling friend (who forgets to grumble when teaching), was the instructor. Big Jim, the boss, sat in on these class sessions whenever possible.

"Fellows," Pete started off, "I had an interesting situation last week. I'd like to share it with you. This car FGE 1240, was reported not cooling. Now if you will take the list of cars we worked out during our last session, you will see that this car falls in the series of FGE 1220 to 1600. Each of these is equipped with a 2-71 Detroit Diesel engine, Frigidaire dual refrigeration system, and an Allen Bradley DRC-15 electrical panel.

"Knowing this before I reached the car, gave me some ideas. When I got there, I found the engine running and the normal voltage pilot lamp lit. That told me that the power plant was functioning properly. Both compressor pilot lamps were lighted and the condenser fan was running. So far, so good. Then I noticed that both of the compressor bodies were frosted over. Now, what would cause that?"

Mike spoke up, "Liquid refrigerant reaching the compressors." "Right!" said Pete. "Let's make a list of things that will cause that. What's first?"

Tony responded, "Expansion valve not adjusted properly."

"Okay," Pete agreed, "What's next?"

No answer.

"Well, lets sketch the basic principles of a refrigeration system," Pete suggested, as he turned to the blackboard. "The basic parts are a compressor, evaporator (boiler), condenser, and an expansion valve. There are other accessories usually added but for right now, we will take only these bare essentials. Let's show them schematically like this.

"Remember now, relatively speaking, the condenser is located outside the car, and the evaporator is inside. The purpose of a refrigeration system is to transfer heat from a location where it isn't wanted to a location where it isn't objectionable. Now, we want to pick up heat at the evaporator and take it around to the condenser and get rid of it there. The heat of the air surrounding the evaporator (generally circulated by a fan), will be absorbed by the liquid refrigerant, causing this refrigerant to boil or evaporate into a gas or vapor.

"This heat-laden gas is drawn off by the suction side of the compressor. It is then compressed and sent on to the condenser at high pressure. The air being blown through and around the condenser removes the heat from this high pressure gas causing it to condense back to a liquid. This liquid leaving the condenser is ready to pass back through the expansion valve and into the evaporator.

"Now notice, if we draw a vertical line through the condenser and evaporator, it will divide the sketch into two sections. To the right of the line is liquid, to the left of the line is gas. Now draw a horizontal line through the compressor and expansion valve. Above the line is high pressure and below the line is low pressure.

"We now have four areas or sections —high pressure gas, high pressure liquid, low pressure liquid and low pressure gas. The first item of the list we started was 'Expansion valve not adjusted properly'. Let's assume for a moment that it is adjusted properly, but still liquid refrigerant is reaching the compressor. Doesn't that mean that heat is not evaporating the refrigerant as it passes through the evaporator?

"Now," Pete asked, "what would keep the heat from reaching the refrigerant in the evaporator?"

"Blower fan not operating."

"Blocked air circulation."

Pete stopped them. "Wait a minute. Let's break that last one down some more. It's too general. What would cause blocked air circulation?"

"Dirty evaporator."

"Iced evaporator."

"The car loaded so that air passage is blocked or so circulating air is short circuited by taking the path of least resistance."

"No, I won't buy all of that." Pete broke in. "Blocked air passages would apply if this car had open circulation, but it is an envelope type car and the lading does not affect air movement. The short circuiting of the air applies to an open circulation car too. I don't believe that this will cause a flooded evaporator which is the technical term for the condition we are discussing.

"That should complete our list. Of the four items, the last one we should worry about is the first on the list—'Expansion valve improperly adjusted'. Very little can go wrong with an expansion valve. If it was adjusted properly and tested when overhauled, it shouldn't get out of adjustment by itself. The circulating blower fan and motor on this car, and on most cars, are enclosed within the loading space and cannot be seen from the machinery compartment. Can any one suggest how we can tell whether it is running or not?"

There was silence for a few moments, and then a big smile came on Mike's face and he answered, "Use a clamp-on ammeter."

"That's right," said Pete. "If current is found in the wire leading to the evaporator fan motor, we can assume that it is running. If the motor was not turning because of mechanical defects, the overload breakers on its contractor would be tripped. That brings us to a dirty or iced evaporator. Which is the most logical one, now that we have determined that the car is an envelope air-distribution car?"

A rather quiet fellow spoke up, "The iced evaporator because little dirt gets in there."

"What will cause an iced evaporator?" queried Pete.

"Equipment not defrosting. There could be something wrong with the defrost timer."

"Almost right," grinned Pete, "But, this car does not defrost on time. It uses a switch that has the fancy name of 'Static Air Pressure Differential Switch.' It is a diaphragm-operated switch with one side of the diaphragm connected into the space above the evaporator and the other side connected to the space below the evaporator. That means that when the evaporator becomes clogged with frost, there will be a difference in the air pressures above and below the evaporator which will be detected by this gadget.

"When this pressure difference is great enough," Pete continued, "the switch will operate and put the equipment into defrost. Any slight leakage around the evaporator or in the lines to the switch, as well as blocked lines, will prevent the equipment from automatically defrosting. That was the trouble that I found last week. One of the copper tubes to the defrost switch was broken. I knew that it would take me a few minutes to repair the tubing, and the sooner I defrosted the better.

"I couldn't remove the cover to the switch because sometimes this will disturb a gasket. I might not get a good seal there again. I went to the electrical panel. The wiring diagram showed me that if I jumpered terminals 9 and 10, the jumper would take the place of the switch. I did, being careful because this is 220 volts. The equipment went into defrost and I repaired the tubing.

"When the evaporator coil was defrosted, a temperature-operated switch —Klixon—operated and the equipment went back into cooling. It was only a few minutes till the car's temperature began to go down. The whole point is that you should evaluate the causes of the troubles before you tear into anything."

As the group broke up, Pete realized that Big Jim had slipped out some time during the class.

"That does it!" he groaned, "now I'll have to give him that yarn all over again. He always wants all the details."

---

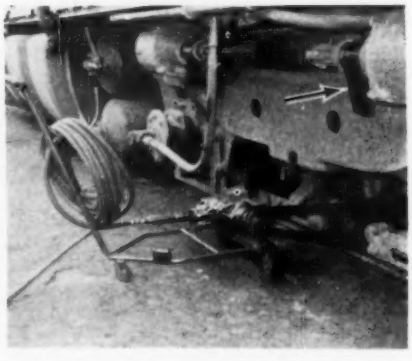
# Brake Adjuster Is Air Powered

THE POWER BRAKE adjuster is a simple little device which saves a large amount of time and labor in adjusting the foundation brake gear of diesel locomotives either when taking up slack or changing brake shoes. This normally is done with a hand wrench and ratchet which turns the adjusting nut only about ⅛ revolution per stroke and thus involves considerable manual effort at each wheel on both sides of a locomotive.

The device, made of salvage materials at the Brooklyn, Ore., shop of the Southern Pacific, consists of a 3⅛-in. hex wrench, set in a hinged frame and driven by a bicycle chain connection to the spindle of a Thor reversible air motor. The motor and hinged wrench are mounted on a light tubular steel frame with convenient handle and three small caster wheels for easy movement alongside the locomotive. The bicycle chain drive gives a 3 to 1 speed reduction from the air motor to the wrench. A hook on the handle supports a coil of light ⅜-in. air hose when it is necessary to move the device any distance about the shop or terminal.

When adjusting brake piston travel, the device is moved to the pair of wheels involved, the hose coupled to the nearest shop air outlet, the hinged hex wrench swung down and applied over the brake adjusting screw nut. A 3-in. wide, U-shaped, steel plate or gauge is applied over the air brake cylinder piston. Air is turned on the motor and the adjusting screw tightened until the brake piston collar just touches the gauge at which time the piston travel is accurately set at 3 in. without further adjustment or measurement.

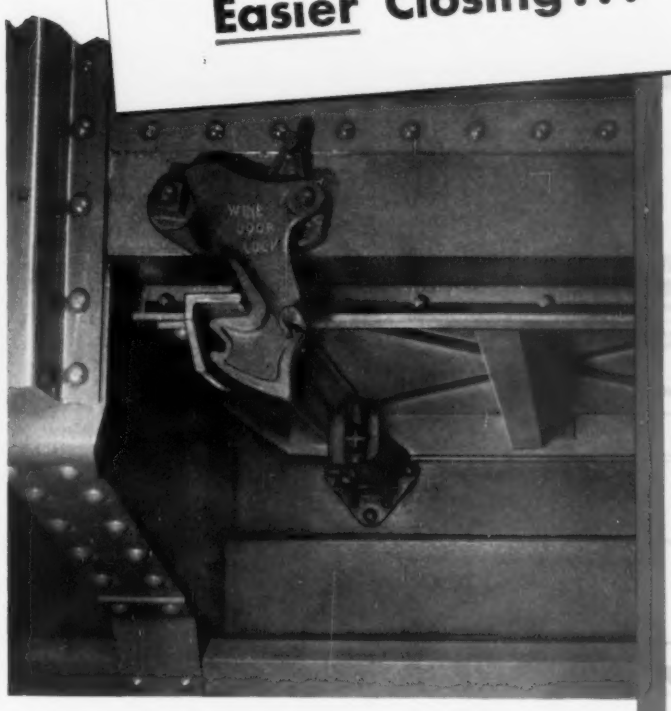
This procedure is quickly followed at wheels along both sides of the locomotive and takes less than one third of the time formerly required with a hand-operated ratchet.



Power brake adjuster speeds work for SP.

The reversible feature of the device is necessary and a special advantage when changing brake shoes. In this case, the brake adjusting screws have to be backed off a considerable distance for brake shoe removal and renewal. Then the slack has to be taken up again to give the standard 3-in. piston travel. For this double operation, the time and labor saving is even greater than when only brake adjustment is required.

# Controlled Unloading — Easier Closing . . .



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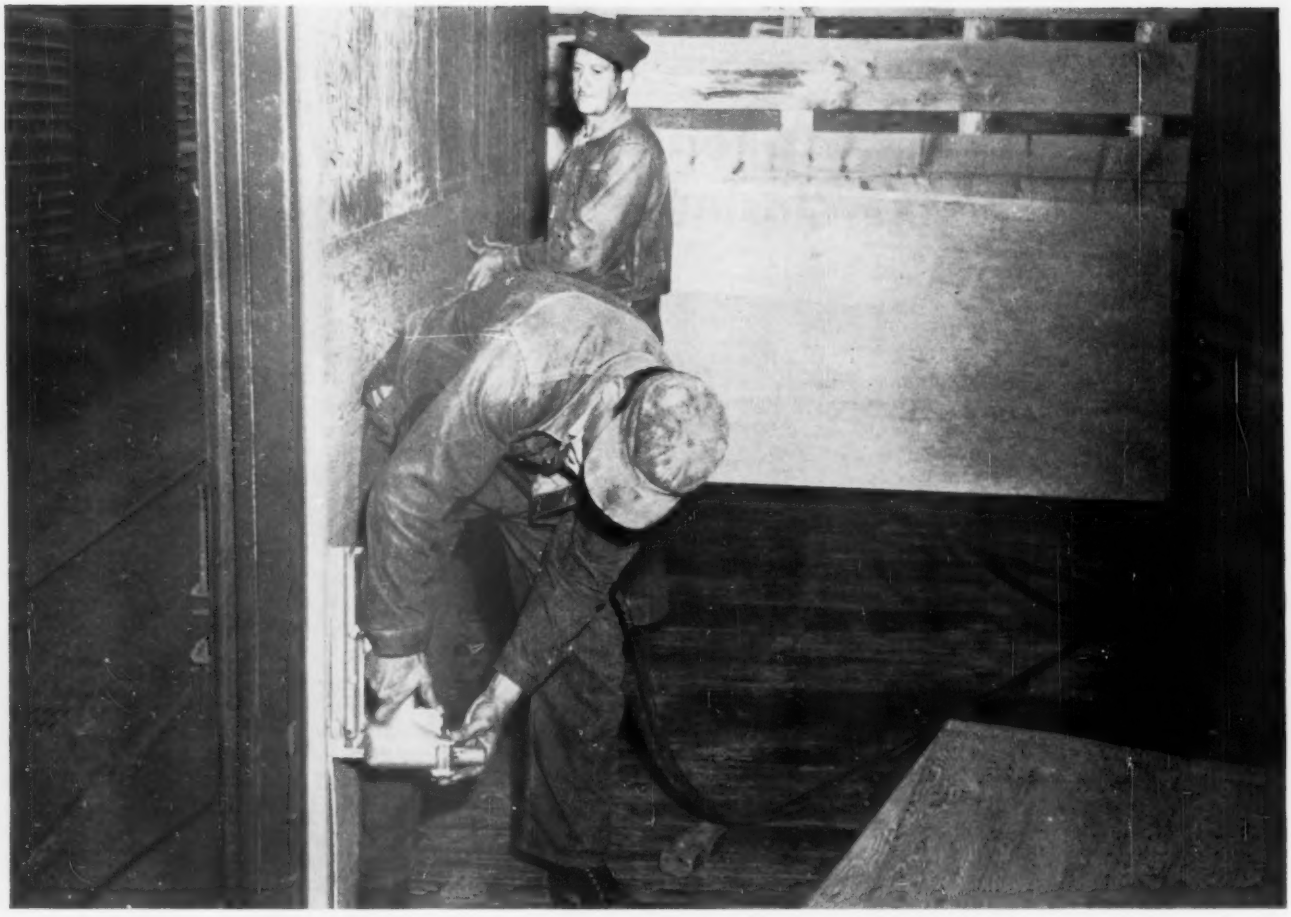


Stapling of plywood lining sheets is completed at door post on SP car. Rabbeted nailing strip is applied at doorway.

# Southern Pacific Upgrades Box Cars with

SINCE THE FIRST of this year, over 1,500 Southern Pacific box cars have been converted from "rough loaders" to smooth, top quality Class A cars. While the end product is the same, the work varies slightly in different areas on the railroad. The Pacific Lines cars repaired on the west coast have 8-ft linings and floors upgraded with cement. Texas and Louisiana Lines cars have 6-ft linings and floors of plywood.

The key to the entire program is smooth, tough, water resistant, standard sized panels of ¼-in. fir plywood applied directly over floor, side walls and ends. Installation is based on an old principle, stapling, which was never tried before. Almost twice as fast as nailing, the sheets are rapidly applied over old surfaces and fastened in place with pneumatic staple guns driven by 90-psi air pressure.

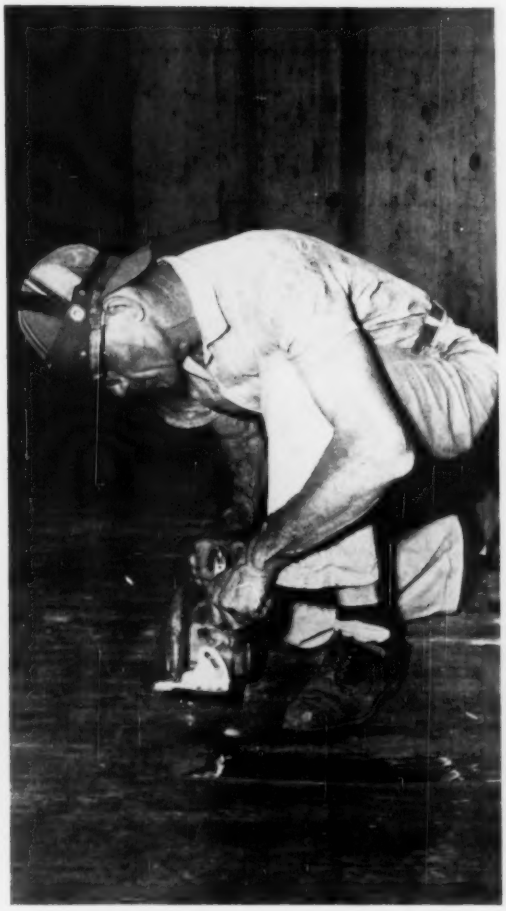
The program was started on a test basis two years ago when a limited number of Class B and C cars were converted to A condition. Results were so satisfactory that additional programs were quickly scheduled. Re-lining with plywood was based on the SP's former practice of stapling Kraft-coated veneer over scuffed car walls as an emergency measure to provide more cars for handling such cargo as canned goods. The veneer lasted about one season while the plywood is expected to last four or five years.

### How Work Is Done

As cars come in for re-lining, they are painted outside when necessary, and the new SP lettering stencil is applied. If contaminated with oil, creosote or other foreign material, the interiors are cleaned with steam and disinfectants. Cement upgraded floors have 10 gal of floor cement applied, brushed on with a 12-in. push broom to give a non-skid surface.

Old veneer, where present, is torn out and protruding nails and tacks are removed. Broken boards on the inner wood wall are repaired. Small gaps in boards are left unpatched. False bulkheads are built to square bulged car ends. They are covered with ¾-in. by 12-in. lumber the width of the car. Nailing strips, rabbeted to take ¼-in. plywood, are fastened to the sides of the door posts. Another rabbet is cut ½ in. deep in the nailing strips so they fit tightly around the metal door frame.

Exterior grade plywood panels are then overlaid on both walls and ends to a height of either 6 ft or 8 ft, leaving a gap of about 2 in. next to the floor. Regular car maintenance—washing and removal of grain and debris, is made



Power saw quickly cuts away damaged floor. T&L Lines shops are applying plywood over this decking.

Lining 8 ft high is applied to cars reconditioned on Coast Lines. Staplers are claimed to be much faster than nailing.

Floors on Coast Lines cars are upgraded with application of cement. Plywood does not reach to the floor.

# Plywood

easier. The panels are applied horizontally. Either two 4-ft sheets or one 4-ft and one 2-ft sheet make up the required height. The joints are staggered and any trimming is done on the job with a portable electric handsaw. Installers shoot staples horizontally at 6-in. intervals around the perimeter of each panel. SP officials say that if the panels are properly stapled, they won't warp even when wetted repeatedly.

One of the chief advantages of the plywood-stapling method is that the cars are out of service for only a very short time. The cars come out clean and costs are low. The program is being carried out by shop forces on the Pacific Lines at West Oakland, Cal. The Texas and Louisiana Lines work is done at the Car Cleaning Track and at Englewood Car shop in Houston, and at Avondale, Lafayette, Ennis and San Antonio.

Exteriors of cars are repainted and the trucks are overhauled and modernized as part of the extensive upgrading program.

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# 1,000 NEW LOCOMOTIVES FOR OLD

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For details on how locomotive modernization can benefit your railroad, call your Electro-Motive representative.

*The thousandth new locomotive for old is this Chicago and Eastern Illinois Railroad passenger unit. "New" 2400 horsepower E9 locomotive contains certain remanufactured components from a twelve-year-old E7 locomotive (photo at right) turned into Electro-Motive after a 1,600,000-mile, high-speed career. "New" unit was christened Eliza Doolittle after the flower girl in the play Pygmalion on which the current play "My Fair Lady" is based.*

**ELECTRO-MOTIVE DIVISION**
**GENERAL MOTORS**

GENERAL MOTORS LOCOMOTIVES

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In Canada: General Motors Diesel Limited, London, Ontario

Main shop reclaims major car components such as couplers, side frames, and brake beams. Rearrangement of shop included installation of car-bottom furnace (center right), relocation of machines to streamline material flow, and elimination of overhead cranes.

Machining of built-up parts is done on tools in this machine shop which was recently equipped with new fluorescent fixtures producing a work-level lighting intensity of 30 footcandles.

# 'Centralized' Reclamation

*New York Central has been changing its reclamation plant to do a bigger and more economical job*

THE NEW YORK CENTRAL'S program of reducing operating expenses by every means has involved a consolidation of repair facilities by the mechanical department. In the course of this, the reclamation and repair of many car and locomotive components have been centralized at the Ashtabula (Ohio) Scrap and Reclamation Plant.

For years, this plant has dismantled retired cars and locomotives for the NYC, prepared and classified the resulting scrap, and reclaimed certain parts for re-use. Actually, changes have recently been made there with the aim of increasing the volume of reclamation, and making the processes more efficient and less costly.

Not long ago, for example, steam heat connectors for passenger cars were repaired in the shops at Mott Haven (New York City), West Albany, Englewood (Chicago) and Beech Grove (Indianapolis). Today all this connector work is being done at Ashtabula with an increase in man-hour productivity of 30 per cent. These connectors are completely overhauled and are thoroughly tested before being sent to all system passenger car repair points for reuse.

The entire Ashtabula operation involves over 400 men at present work levels. Recently, the plant has been scrapping 18 freight cars, one passenger car, and one locomotive daily. Typical output has been about 75,000 tons of ferrous scrap per year. This scrap is cut to foundry and open-hearth sizes and completely segregated.

Even this scrapping has been studied to make it more efficient. The Central has the Ashtabula plant completely piped with oxygen and acetylene. The oxygen comes from a large cascade serviced by Air Reduction, and the acetylene is produced by two Airco automatic generators. Studies of metal cutting procedures have been undertaken because a steady increase in labor costs can make it more economical to step up gas consumption, if it will increase cutting rates. Gas prices have been fairly stable. Currently, a series of tests are being concluded on determinations of the most efficient cutting tips, and the best oxygen pressures to get these maximum cutting rates. Already tests have been finished on the use of natural gas and liquefied petroleum gas as possible substitutes for the acetylene. At Ashtabula, acetylene has been found best for demolition work.

Classification and processing of nonferrous scrap have led to the production of pigs of fairly pure brass, copper, lead, and aluminum by methods new to the Central. Ashtabula was getting increasing quantities of electrical cable, switch gear, armatures, radiators, and other components from diesel and electric locomotives. At the same time, the shop was receiving signal department scrap of a similar type.

A second-hand 6,000-lb, oil-fired, brass furnace was obtained. It was equipped with an air motor for pouring. At first it was thought that mixtures of all the non-ferrous scrap coming into the shop could be melted together in this furnace and then be separated by pouring at their successively higher melting points. For instance, tin would be poured at 450 to 500 deg F, lead at between 600 and 700 deg F, and zinc at 750 to 850 deg F.

This did not prove to be successful. Actually, the NYC now hand sorts electrical scrap into copper, brass, aluminum and other classifications. No attempt is made to remove bakelite, rubber and other organic materials which form the insulation, guides and housings for many of the parts. Instead, these materials are either burned out in the furnace or form a slag which can be poured separately. A two-ton charge of any of the sorted metals is melted in about three hours. The pigs

*(Continued on page 44)*

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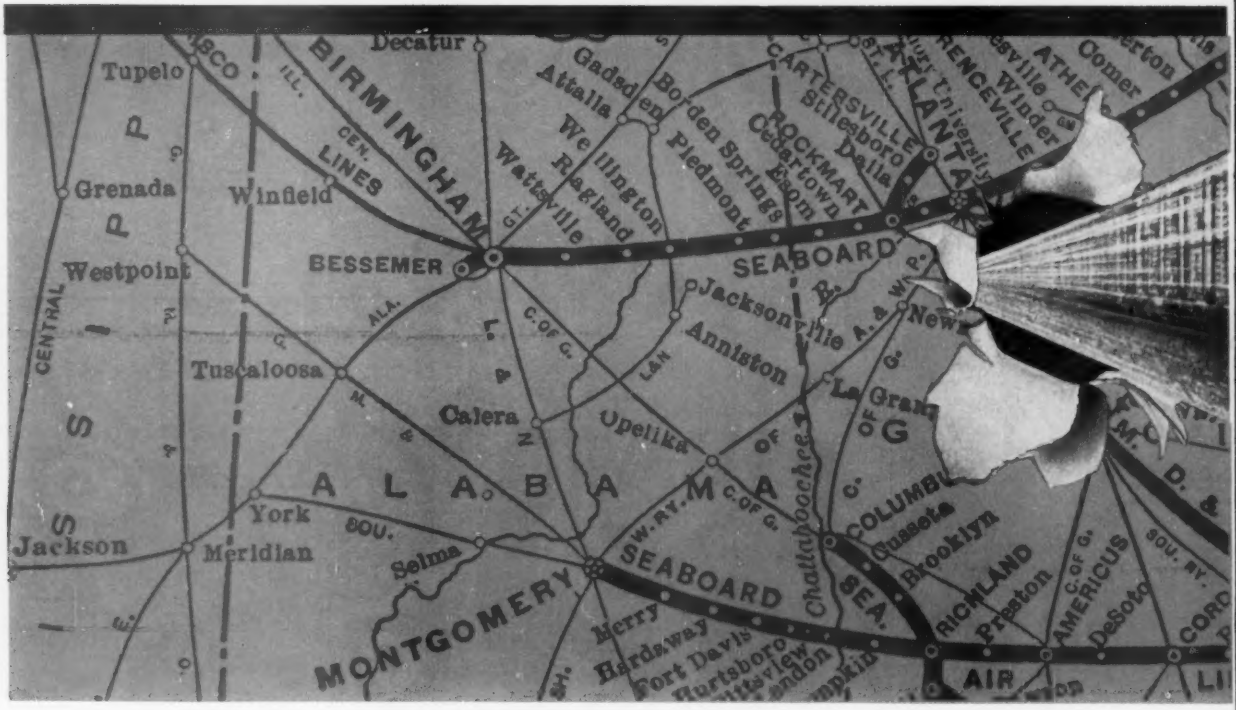
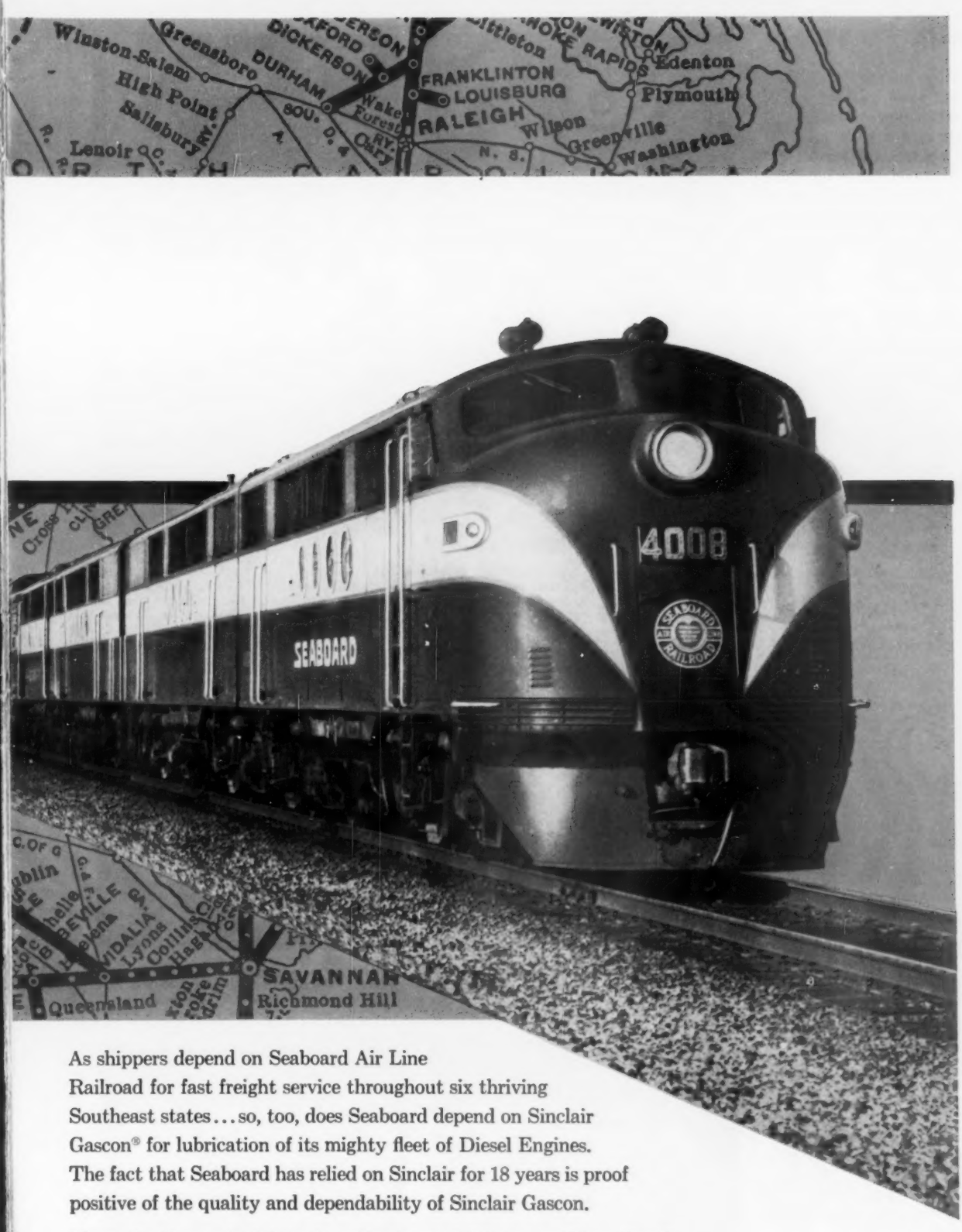



**SINCLAIR RAILROAD LUBRICANTS**

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are being sold at prices which make the process attractive.

The main shop building at Ashtabula contains the tools and equipment used in the reclamation of major car components. These are such parts as couplers, yokes, holsters, side frames and brake beams. Many of the tools have been rearranged in this shop to streamline and straighten parts flow. Materials handling methods have been completely changed.

To give an idea of the results produced by NYC's industrial engineers at Ashtabula, the distance traversed by a coupler during reclamation has been decreased by ¾ mile in a building only 500 ft long. Straight paved aisles, the relocation of machine tools so they can be reached by fork trucks have almost eliminated the use of overhead cranes. This has helped production because formerly work stopped each time an overhead crane carried something down through the shop. The foreman's office was installed on a balcony which has been an aid in controlling every phase of the operation.

### Air Brake Shop

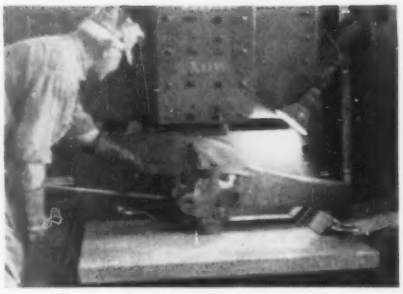
The air brake shop handles a number of items which come through in large numbers. Among these are the steam connectors—already mentioned—air hoses, brake cylinders and other brake components. The recently installed air hose line consolidates this type of work at Ashtabula. Some clamping machines were brought in from another shop. At that shop, the work flow was not progressive and the operation occupied a space four times larger than is now used. The new production line can turn out 400 hoses per day.

At full hose production, four men are required. The first man strips the old hose and puts the couplings and nipples in separate containers. A second man gages, inspects and buffs the couplings, and installs new gaskets. These couplings then travel on a belt to the assembly station where a third man installs them on new hose and passes the hose to a fourth man who operates a Punch Lok clamping machine to secure the coupling and nipple. He also tests the hose. No man need move from his work station. A less elaborate set-up is just now being developed for armored hoses.

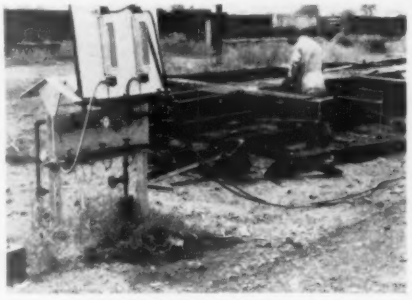
The line for reclamation of steam connectors has turned out as many as 1,500 units a month. The reclamation includes building up the clamps and the gasket seats on the heads.

This set-up must be arranged so that

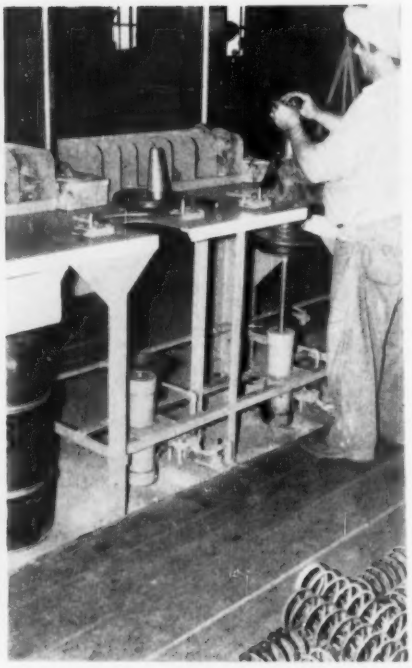
*(Continued on Page 46)*



Initial heating of couplers for 20 min at 1,700 deg F opens up any cracks and prepares them for gaging. Under air press, opening is first closed and shank is then straightened.

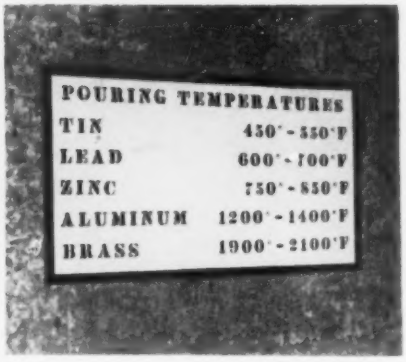


Experimental cutting with flowrators shown mounted on gas manifold in scrap yard has yielded data on most efficient tip and best oxygen pressure. Central uses acetylene, but has tested propane and natural gas.

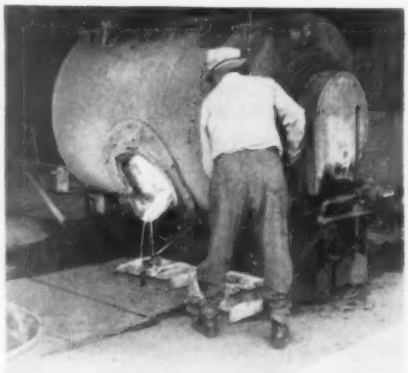


Brake cylinder reclamation line recently set up includes this bench for working pistons. Bins of individual parts are at rear. Lathe has been installed on this line to do cylinder work exclusively.

Classified scrap in tote boxes consists of brass charge in the form of valves, contactors and similar parts. Barrels contain shielded cable.




Non-ferrous metals cannot be mixed indiscriminately and then separated only on the basis of their melting points shown on table near furnace.



Molten brass is poured from oil-fired furnace. Some insulation is burned out of scrap charge but bakelite and similar materials form a slag.

Pigs of various metals can be sold at prices which make the sorting and melting of scrapped electrical parts worth-while for the NYC.

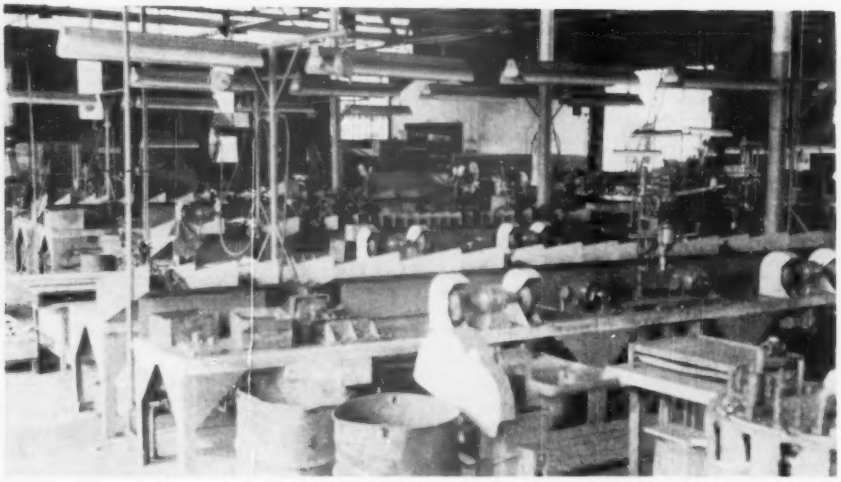
## Yellow Strand Braided Safety Slings

You're sure with Yellow Strand Braided Safety Slings on your equipment. These slings combine strength and flexibility to provide safety and ease of handling.

There's a Yellow Strand Sling designed to handle any load on your railroad from a highly polished crankshaft to a Diesel locomotive. Write us today and tell us the size, weight and nature of your problem lift. Our engineers will design a sling to exactly meet your needs! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.

Yellow Strand® **WIRE ROPE**

## *NYC Reclaims Its Steam Connectors*

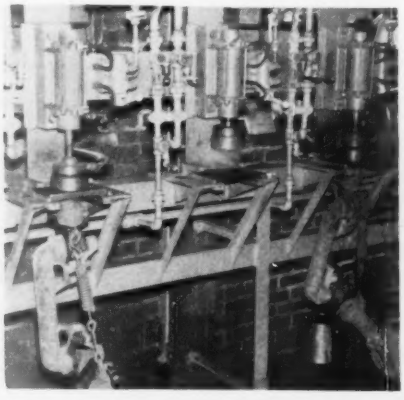


Steam heat connectors, handled in brake shop, are torn down and assembled on any one of three benches. On near sides of these benches, connectors are disassembled. Parts are classified in sloping bins feeding to assembly position on the opposite sides.

Brazing is used for build-up of some worn surfaces. This positioner is treadle-operated.

Air-operated wrench is suspended over assembly position.

Below: Bench clamp holds connector while it is being assembled.
Center: Test rack for steam heat connectors has four positions. Adapter plates make it possible to test different sizes. Air cylinder clamps gasket-equipped cap on top of connector and steam is then fed through it.
Lower right: Test consists of closing end of connector and filling it with steam at train-line pressure. It is then moved at all flexible joints to test for leaks. Finally, it is cooled with water to make removal easy.



production can be varied greatly because the demand for these connectors changes through the year, with the peak during winter months.

Three double benches are used. The center of each bench has a series of sloping bins from which parts feed to the assembly stations. Connectors are torn down on one side. Parts which do not require re-working are buffed, inspected and placed in the bins. Others, which require building up, go to welding or brazing booths and to the machine shop before coming back to the assembly benches. Depending on the work loads, connectors of 2 and 2½ in. sizes may be handled on separate benches. The same thing may be done with those made by Barco and Vapor Heating Corp.

A most interesting feature about the connector reclamation is the test rack for checking connectors after rebuilding. Its features include air cylinders which clamp the steam connectors to the test outlets and quick-operating valves on air, steam and water line to these test outlets. These features are responsible for the greatly reduced labor costs and increased production in this phase of the operation.

The test rack has four test outlets, and can be worked with one or two operators as production requirements dictate. After being placed in the rack, steam is passed through the connector after a dummy coupling has been applied to close the end. After the steam tightness is assured, water is passed through the connector to cool it for handling. Water and condensate go into a pit under grating floor at test rack.

Equipment of the type described has been a big factor in controlling maintenance of equipment costs on the New York Central. Not only in this shop, but in all its installations, procedures are always being refined with the aim of reducing costs still further.

# Research Finds Extra Dollars of Income Through Savings in Maintenance!

## IMPROVED FILTRATION IMPORTANT AREA FOR DEVELOPING OPERATING ECONOMIES

**ANALYSIS OF TYPICAL SLUDGE IN DIESEL LUBRICATING OIL**

| | |
|---|---|
| Oxidized Oil (Resins) | 19.0% |
| Amorphous Carbon (Soot) | 34.0 |
| Miscellaneous Metals | 0.8 |
| Silica | 0.2 |
| Water | 3.0 |
| Lubricating Oil | 43.0 |

Shown at the left—the famous WIXITE Primary Fuel Filter Cartridge, long recognized for extra protection and extra mileage. At the right—the New WIX POROSITE Second Stage Fuel Filter which completely changes standards of performance in the filtration of Railroad Diesel Fuel Oil.

**The analysis shown is that made of sludge deposits taken from a Diesel engine crankcase and it should be borne in mind that the percentages shown will vary substantially with: A) Different engines, B) Various types of service, C) Differing geographic areas and D) Efficiency of filters.**

**WIX Filter Cartridges are available in a broad selection of filtrants to enable maintenance technicians to prescribe precisely the filtering formula suited to the individual engine, conditions of service, etc.**

**Thus, with WIX Cartridges, higher filtering efficiency for each unit returns definite advantages in performance *and direct economies.***

**WIX CORPORATION • GASTONIA • N. C.**
In Canada: Wix Corporation Ltd., Toronto

When it comes to immobilizing a Diesel Locomotive, an avalanche is neither more definite nor more costly than "just a little" dirt in Fuel or Lubricating Oil. The fact is—the "just a little" dirt costs America's Railroads infinitely more than all other catastrophes put together.

WIX Research is directed toward the twin objectives of: A) Filtration that reduces wear in engine moving parts, and B) Higher engine performance and extended periods between overhaul.

WIX Prescription Filtration includes new developments that promise definite and substantial savings in operating and maintenance costs. Laboratory and Field Tests point to improved operating efficiency, less time in the shop and less frequent lay-ups, lower filter cost per hundred miles. Yes, WIX Research Finds Extra Dollars of Income for You in Dollars You Save in Maintenance.

*Write for full information on new developments in WIX Prescription Filtration*

Industrial Division
Wix Corporation
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Please send me information on new WIX POROSITE Fuel Filters and latest WIX Catalog.

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GN passenger trains terminating at St. Paul, Minn., are now serviced on one of the two tracks running through this 625-ft building.

Repairs on sides and tops of passenger cars are made easily with adjustable-height platforms.

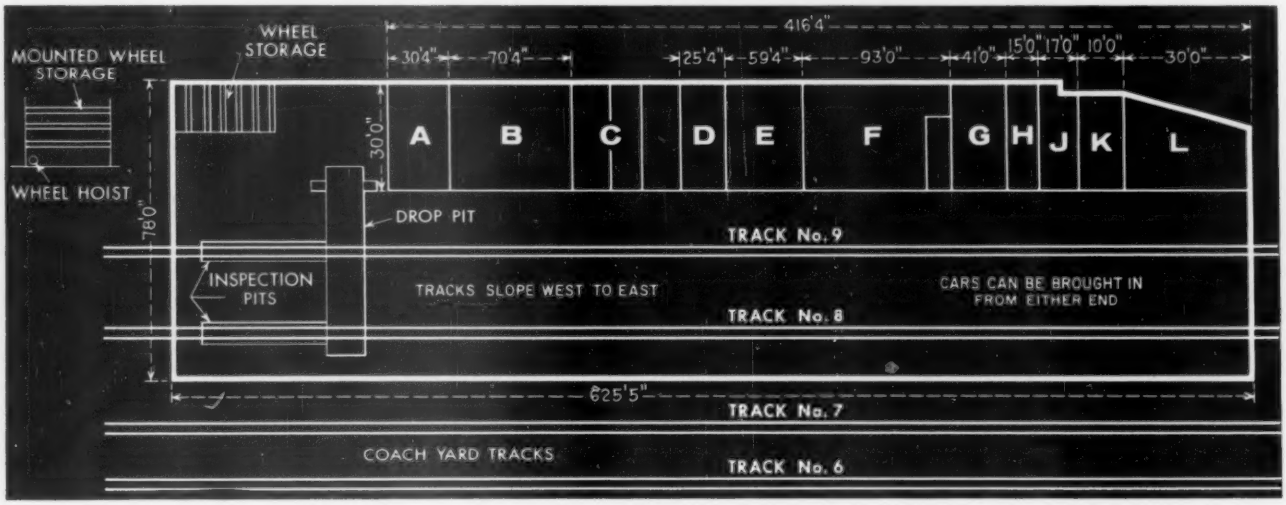
*How the Great Northern*

# Solves Its Winter Coach Repair Problems

*New heated coach yard building consolidates all repair services to improve efficiency*

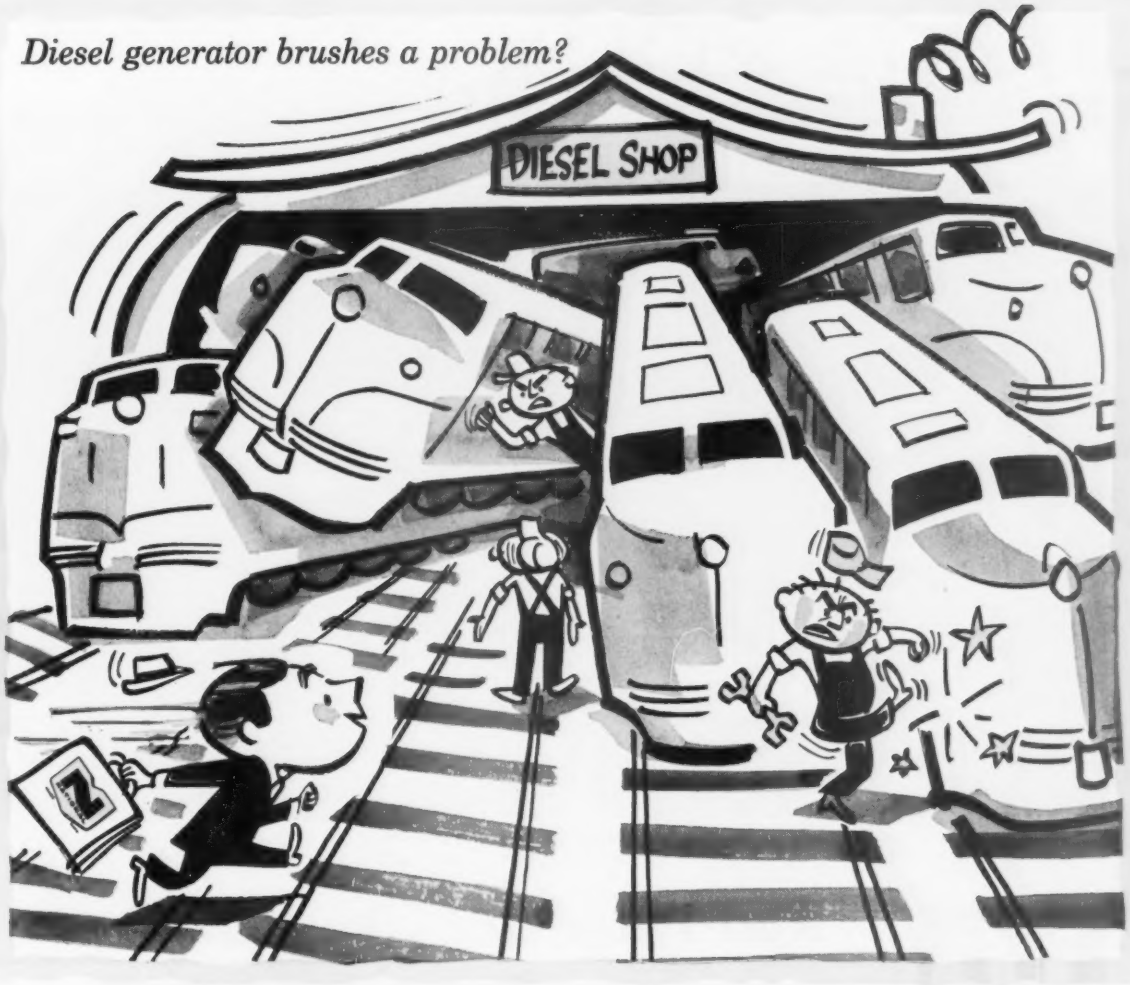
NINE TRACKS, each over 1,000 ft long, in the Great Northern's Mississippi Street Coach Yard, St. Paul, Minn., have been used for servicing passenger trains. They operated efficiently when compared to many such installations. However, six months of winter hampered operations. Servicing schedules for equipment of the Winnipeg, Red River and Twin Port runs must be maintained. Materials handling and necessary repairs were slowed down by snow, ice and extremely cold weather. As much as three tons of ice had to be removed from a single car for inspection and repairs. Workmen wore heavy, bulky clothing and mittens, and even

*(Continued on Page 58)*




Work area of approximately 50,000 sq ft has been provided in new repair building. Series of small rooms on the north side of the building include (A) office, (B) locker room, (C) toilets, (D) tool and brake room, (E) electric shop, (F) storeroom, (G) smith shop, (H) oil room, (J) upholstery shop, (K) filter room, and (L) locker room.

*Diesel generator brushes a problem?*




# Your NATIONAL brush man helped this road stop excessive maintenance!

JOHN PEDLAR

Serious copper dragging and flashovers kept putting diesel main generators out of action on this mid-western railroad. The result, says "National" Carbon Brush Man, John Pedlar, was a critical repair and maintenance problem.

By carefully analyzing generator workload, John Pedlar, working closely with the railroad, found improper brush selection the source of trouble. Grade DE-2 "National" brushes were recommended and applied. The road now considers its generator brush operation completely satisfactory.

John Pedlar and his fellow "National" Carbon Brush Men have been solving railroad brush problems for years. Their experience and training – backed by "National" *long term brush development* – make them the logical consultants on any railroad brush problem.

Call your "National" Brush Man today. Or write National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

*The terms "National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation*

**NATIONAL CARBON COMPANY • Division of Union Carbide Corporation • 30 East 42nd Street, New York 17, N. Y.**

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# ELECTRICAL SECTION

Armature conductors can be sawed through before stripping the winding.

10

## Roll Them Out Like New

## Armature Stripping

ARMATURE REBUILDING is a major operation requiring skill and involving the use of special tools not usually found in a railroad backshop. As with surgery, proper preparation is of prime importance. Carelessness can cause needless trouble and expense. It's as necessary to know the internal construction of the armature as it is for a surgeon to know human anatomy.

Certain special tools, including a shimming knife, a lead-lifting tool, a lead-drifting tool and an equalizer slot cleaning tool, will be required. They are necessary to open the soldered joints and to remove the main and equalizer coil leads without damaging the commutator risers. A small rotary sander is useful for cleaning the riser slots and saves a lot of time over hand filing. Approximately twenty commutator riser slot gages are needed to help straighten the risers after stripping. These can be made from ordinary cold-rolled sheet steel slightly thinner than the slot width.

You will also require long coil-lifting bars suitable for use in core slots, bolt cutters for cutting through heavy coil sections, wedge driving tools, and an air hammer. Hardened core slot gages, ground to have just enough looseness for an easy "feel" in a correct slot are handy for checking the straightness of the core teeth after stripping and the accuracy of slot size after straightening and cleaning. A gas torch is needed for heating the commutator risers to soften the solder. Natural gas is better than acetylene because it covers more area and is less liable to overheat and anneal the bars.

**Different Methods**

Armature stripping procedures vary from shop to shop. The method used is determined largely by the equipment available and the volume of work handled. Bands and wedges are generally removed first. The wire bands are usually cut through with a chisel, but some shops grind through them with an abrasive wheel. Usually the winding is not protected, because it is to be scrapped. If it is to be saved, a bladed tool about one inch wide and $\frac{3}{32}$ in. thick may be driven under the band. Then it's easy to chisel through at the edge of the blade without harming the winding. If you use an abrasive wheel, be careful not to cut into the winding. These precautions pay off when rebanding a good winding.

Most shops remove the wedges cold. This works well on old armatures with loose windings. On an occasional stubborn

*(Continued on Page 54)*

This is the tenth article in the series covering heavy maintenance of locomotive electrical equipment.

Part 10 is written by W. F. Davis, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

## CLEANER, LONGER LASTING

Esso Diol RD crankcase oils meet the need of modern diesels for very effective and economical detergent lubricants that will provide maximum protection for sensitive engine parts.

Even after the most severe freight or passenger operation, engines using Diol RD are exceptionally clean. They show a minimum of carbon deposits in the piston ring zone... very little lacquer or varnish on piston skirts and exhaust valve stems. And Diol RD oils effectively prevent corrosion of the silver wrist pin bushings or alloy bearings.

The good oxidation stability of the base stock in Diol RD oils is bolstered by the detergent-inhibitor additive used. Result: greater mileage between oil changes, with consequent lower costs. For data or technical assistance call your local Esso office or contact: Esso Standard Oil Co., Railroad Sales Division, 15 W. 51st St., New York 19, N. Y. *perfected by research... proved in performance*

# DIOL® RD

Esso

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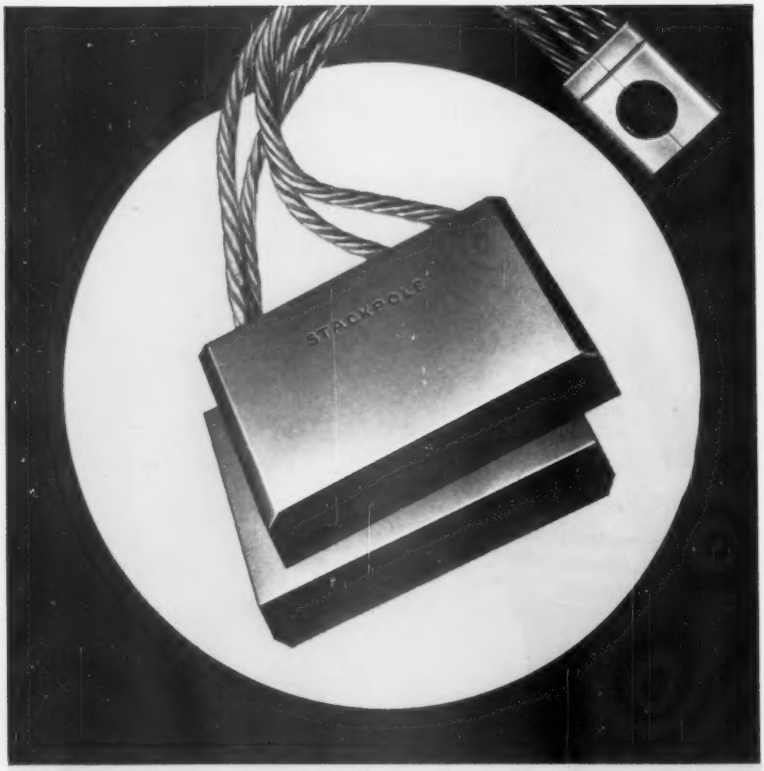


One of the big reasons why commutator reconditioning costs have been coming down!

STACKPOLE
diesel electric
BRUSHES
for maximum mileage consistent with smooth, burn-free commutation
STACKPOLE CARBON COMPANY, St. Marys, Pa.

## QUESTIONS AND ANSWERS

# 6-SL Brake Equipment*

**What air connections are made?** (W288)
The equalizing pipe is connected with passage *13*, and through *31* with the brake cylinder pipe.

**How does this position of the H-6-B Relayair valve unit affect the brakes on the first locomotive.** (W289)
They operate in the same fashion as those on basic equipment.

**Where else is brake cylinder air maintained?** (W290)
In the equalizing pipe.

**What should be the position of the brake valve handle of the KH-6-P type on the trailing unit?** (W291)
In *Lap* position.

**Why is it necessary to have this brake valve handle in Lap position?** (W292)
In order to close exhaust passage of distributing valve release pipe through independent brake valve portion and rotary valve.

**What should be the position of the independent brake valve handle?** (W293)
In *Running* position.

**In multiple unit operation, what should be the position of the brake pipe cut-out cock on the trailing unit?** (W294)
In the *Trailing* position.

**What connection is made in this position?** (W295)
Main reservoir pipe is connected to the transfer valve pipe.

**What flow of air results from above connection?** (W296)
Main reservoir pressure flows to diaphragm *10* of the transfer valve portion of the H-6-B Relayair valve unit.

**What action now takes place in the transfer valve portion?** (W297)
The diaphragm is forced downward by the air pressure, seating valve *17* and unseating valve *15*.

**What air flow results from this movement?** (W298)
The application cylinder pipe is now connected to passage *13*.

**Explain the flow of air further.** (W299)
Since main reservoir pressure is on the diaphragm of the cut-off valve portion of the relayair valve unit, passage *13* is connected to the equalizing pipe. Therefore, the application cylinder pipe and equalizing pipe are connected.

**What insurance does this connection provide?** (W300)
This insures that the brake cylinder pressure in the trailing unit will be identical to that in the first locomotive, since it places equalizing pipe air pressure in chamber *g* of the application cylinder regardless of the position of slide valve and piston.

*(*This is continued from page 60 of the Jan. 1958 issue.)*

NAILABLE STEEL FLOORING *being installed in one of 200 new gondolas for Canadian National Railways in the Canadian Car Company shops, Montreal, Quebec.*

# N-S-F® helps CANADIAN NATIONAL RAILWAYS IMPROVE service to shippers

Customer-minded railroads are building better service and longer life into their gondolas and boxcars by installing NAILABLE STEEL FLOORING. Gondolas equipped with N-S-F can withstand normal crane loading and unusually heavy freight without floor damage. N-S-F, pioneer in its field, helps railroads move more freight with fewer cars, because cars stay "Class A" longer by the elimination of floor repairs.

For complete performance and cost studies of N-S-F for gondolas and boxcars, new or heavy repair applications, contact our nearest representative in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis, Atlanta. *In Canada,* N-S-F *is made and sold by International Equipment Co., Ltd., Montreal.*

*One of 200 65'6" drop-end gondolas equipped with* N-S-F *which were specially built for CNR for use by mills to haul structural steel and other steel products in Canada.*

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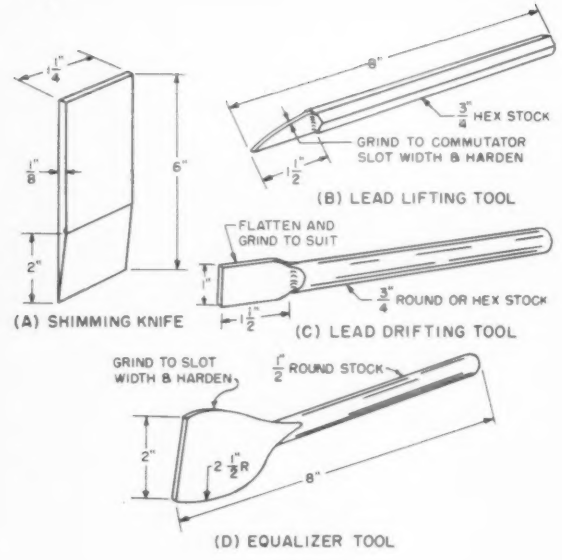
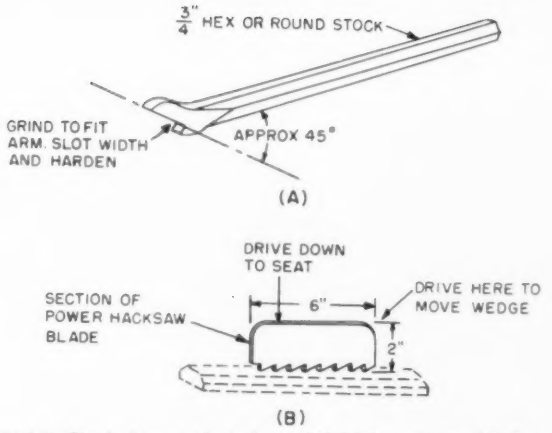



At left: Simple home-made tools are helpful in armature stripping.

Above: Tools for driving armature wedges. Stubborn wedges may be moved with lower tool.

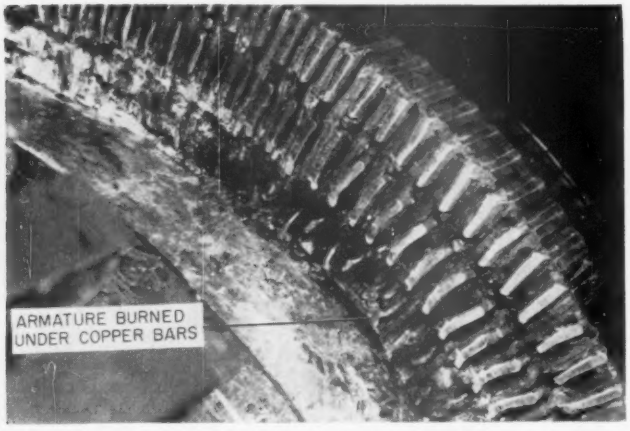
(*Continued from page 50*)

job it is helpful to soften the varnish by heating the armature in an oven, or with a gas torch as you work. Tools for driving wedges out are of various shapes. They should fit the slot with clearance, and present a maximum face area against the end of the wedge. Also, they should be easy to insert at the center of the core slot and have a biting edge to cut into the wedge to start it.

Wedges are usually driven out of half the slot length at a time, using either a hand or power hammer. If a wedge is stubborn, try starting a shorter length. Another form of "persuader" can be made from a power hacksaw blade. It is hammered down until all teeth are biting into the wedge. Diagonal blows will then move the wedge.

### Circumstantial Evidence

By noting whether bands and wedges are tight or loose, and looking up the mileage on the machine, you will pick up valuable clues regarding the kind of service the armature has seen. An armature with upwards of a million miles of normal service will show some loosening of the bands and slight "powdering" of the insulation under the bands and wedges and into the lower layers of the winding. This is caused by movements and vibrations resulting from service conditions. In the case of traction motors, the principal factor is vibration from the gearing. Well maintained gears with correct tooth profile run smoothly and are easy on the windings.




After coils have been sawed off and removed, cut-off leads in risers are exposed at back of commutator. This armature has been burned.

Worn gears with poor tooth profile cause destructive vibrations which "shake down" the windings to failure in short mileage. Here you see how good gear maintenance with correct and adequate lubrication will pay off in long armature winding life. Report the conditions you find, particularly in the case of low-mileage rewinds. When things are bad you will want to inspect the pinion from the armature and, if necessary, check it with a profile gage. If the pinion is O.K. the fault may be in the mating gear. Relaying this information to the mechanical people will alert them to this possible cause of trouble and they can pull the bad gear out of service before it does more damage.

### Armature Stripping

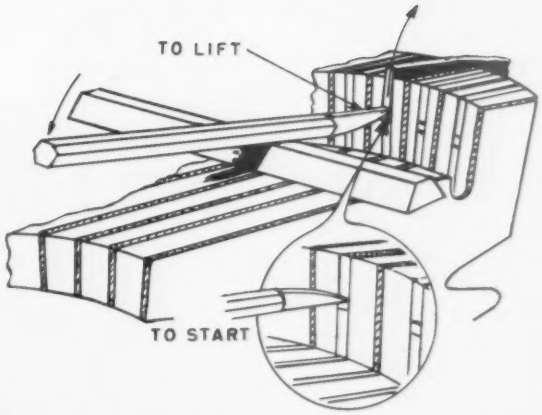
Many shops cut off the winding at both ends of the core. This can be done with a chisel; by turning off using a cutting tool in a lathe; or by sawing. If the commutator is to be reused, the lead ends must be removed as described later. In sawing the coils, take care not to cut too deep or the mica cone insulation will be damaged and you will then have a commutator repair job.

Some shops pull the coils out with a power hoist. The front legs of the coils are lifted so they can be gripped by a tool like a lineman's "come-along." Sometimes the wedges are not removed first. The top coils are lifted from the slots, tearing through the wedges. Considerable core slot straightening is required when this method is used because the punching teeth move sideways when the wedges are sheared.

If the windings are not cut off behind the commutator, the leads will have to be lifted from the risers by hand before the coils are pulled. The commutator will generally be saved. Be as careful as possible with it—taking particular care not to damage the thin risers. Do not bend the risers unduly, or upset the stability of the complete set of bars while disconnecting the main winding leads.

When the coils are pulled by hand the work is sometimes easier if the armature is hot. On jobs with the usual pattern of high mileage wear, heating the entire armature is unnecessary. The aged coils can easily be lifted cold. On most jobs, however, it is necessary to use a torch to soften the solder in the commutator risers before lifting the leads. When an armature has thrown solder and the leads have lifted, they can usually be removed without heating. If the soldered joints are opened with a shimming knife, heat will not be necessary.

A simple set-up makes the job of lead lifting easy and




At left: Power stripping an armature, without first removing wedges, can damage slots.
Above: Coil lead can be lifted out of commutator riser slot if soldered joints are first opened.

efficient. So it can be rotated, the armature is placed in pedestals. A gas torch is clamped in a position to play flame on the face of the commutator risers. The armature is rotated every few minutes just enough to move the hot area out of the flame. The hot leads may then be lifted. Your gloves will soon get pretty hot working near the open flame, so have an extra pair handy. The first time around, only the top leads are lifted. When all the leads of a coil are free, bend it back out of the way. Then it is easier to get under the next coil back of the risers to pry it up. Use only enough heat to soften the solder. Overheating will damage the binder in the mica and anneal the copper.

A heavy screwdriver or small bar can be used to lift the coil enough to get a long pry bar into the slot under it. By driving and prying, the coil is lifted from the slot. After all the top coils have been lifted, it's a good idea to get them out of the way by snipping them off at the back with bolt cutters. Then, working from the back end, lift the bottom coil sections from the slots. Since the bottom leads are still soldered in the commutator risers, you will have to again use the torch to soften the solder. Pry under the coil leads at the back of the commutator with a small bar, working the coil out with the other hand.

Using a chisel, cut off the equalizers behind the commutator. Then you can remove this winding complete, leaving only the leads in the commutator risers. These should be removed at once while the commutator is still hot. When using the torch this time, aim it to strike more on the brush surface than on the risers. Using the equalizer tool, work from the front of the commutator, driving the loose ends to the back with a "down and out" motion. This will push the lead and filler out and back, and clean the curved bottom of the slot. You can usually tell if all the leads are out by checking whether any are still protruding at the back of the risers. Some may break off in the riser slots, so check carefully.

### Core Cleaning

Much torn insulation will stick to the sides and bottoms of the slots. Also, there will be varnish on the tops and ends of the teeth, and in the wedge grooves. A lot of scraping, filing and brushing is required to completely clean the core by hand. It is quicker to do a rough cleaning job with a knife and scraper, heating stubborn patches with a torch to loosen them. A sand blast following this rough cleaning will remove the varnish and small bits of insulation. If this is not available, hand filing and wire brushing after scraping will produce a clean core. The cylindrical heads, as well as the core laminations should be cleaned. Small burned spots in the slots should be filed smooth or they will damage the insulation of the new winding. Repair of more extensive damage will be discussed later.

After the core has been cleaned the slots should be gaged to see if they need straightening. Bent teeth should be straightened carefully until the slot gage fits.

### Commutator Checkup

Now that the leads are disconnected and the core cleaned, you are ready for further commutator inspection and test. Remove the outer string band and examine the mica cones for visible damage or burned spots. There can be bad burning under a group of bars which have shorted and lifted. You would decide to replace such a commutator rather than do further work on it. If everything looks O.K., make a hipot test at the recommended voltage to detect hidden faults.

If the commutator passes this test, you can go ahead with the cleanup job. Use a steel chisel with a long, gradual taper to open up the riser slots so you can sand the inner faces. Open one slot at a time, allowing the adjacent risers to bend until there is room enough for the file or sander disk. Work carefully so as not to damage the mica between the risers. After cleaning all slots, the risers must be straightened. This is done by using thin riser gages as filler pieces. Insert one in a slot and straighten the risers. Then insert another in the next slot and straighten the risers. Continue until the set of fillers is used up. Then remove the filler farthest from where you are working and use it in the next slot. Repeat this until all the risers are straightened.

As a final check you will want to make a bar-to-bar test at the recommended voltage. First, the commutator surface should be cleaned by sanding or brushing and the remaining dirt in the slots between the bars removed. This test will show up any shorts between bars. Considerable digging and scraping may be necessary to clear these up. Dirt must be removed in a manner that will not tear the mica insulation or make it flake out in the riser section. Keep cleaning and retesting until all the bars are clear.

Stripping the armature is really the beginning of the repair job—the foundation on which the rewind is based. The best house may collapse in a short time if the foundation is poor. So, the most carefully rewound armature may quickly fail if the cleaning and preparation are slighted or done carelessly.

# *They Didn't Double Cross This Diesel*

**By Gordon Taylor**

A B-UNIT, MODEL F7, had been in a wreck that damaged control wiring. When repairs were completed, the electrician was instructed to check it out for service. He had the unit assembled as the middle unit of a three-unit locomotive, with an A-unit at each end.

The B-unit was placed so its front end was coupled to the rear of the east end A unit. This meant that the rear end of the B-unit was then coupled to the rear end of the west end A-unit. When the jumper cables were put up, it was found that something was wrong.

The first test used the controls of the west end A-unit. When its reverser was put in forward position and the throttle opened, this A-unit did move forward and the B-unit moved in the same direction, (actually the B was operating in reverse, as it should when coupled this way). However, the east end A-unit began moving its own forward direction, pulling against the other two units. Closing the throttle, the electrician studied this turn of events.

Finally, he said, "Let's move the controls to the controls of the A-unit at the east end and see what happens." The east end A-unit was set up for its forward movement. When the throttle was opened, this A-unit responded properly to its reverser setting, but again the B- and the trailing A-unit began to move the opposite way. Things were getting worse instead of better.

One of the other electricians said, "In training class, we learned that the jumper control cables have wires *8* and *9* crossed or reversed from one plug end to the other." These are the wires that connect the Forward and Reverse (*FO and RE*) trunk wires in the control circuit.

"I'll go along with testing jumpers," Belter replied, "but I think they're okay because the two A-units worked perfectly together before the B-unit was cut in." Jumper cables were tested and did prove to be okay. Belter said, "I guess we'd better call Doc Watts. This seems to be a case for him." Doc Watts, the electrical foreman, was an ace trouble shooter.

A worried Belter made a rough sketch and took it to Doc Watts. Laying the sketch in front of his foreman, Belter said, "Tell me what you make of this. That B-unit is the double-crosser in this line-up, but I have no idea what is causing the trouble."

"You call the B-unit a double-crosser," Doc Watts answered after some thought, "but I believe that the trouble can be corrected by putting a double-cross in that B-unit's control wiring. Let's make another diagram with an outline of control wires *8* and *9* as they should be."

The *FO* and *RE* wires are interchanged in the jumper cable. The *FO* and *RE* wires are also interchanged at the front jumper cable socket or receptacle of each unit. It will be noted that these wires are interchanged or crossed at the front end of the B-unit in the sketch. Since most A-units have only one jumper cable socket, which is at the rear end of the unit, the *FO* and *RE* trunk wires are not interchanged in the cable socket of A-units. If an A-unit is wired with a jumper cable socket at the front end, then the *FO* and *RE* wires would have to be interchanged in that socket.

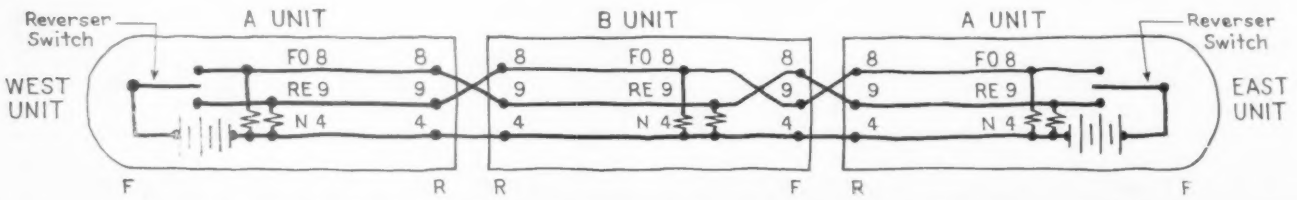
After checking his diagram, Doc Watts said to Belter, "I will bet that *FO* and *RE* wires were not interchanged on the terminal board located near the ceiling at the front end of that B-unit."

A quick inspection showed this to

be the trouble. With about two minutes work, the connections were changed and everything was okay. The diesel units pulled together as team members should.

When two A-units are connected back to back, they need only the crossing of wires in the jumper cable to make them work properly. In that case the *FO* (or *8* wire) is energized by contact with the battery when the reverser handle is moved to forward position. The *8* wire then passes control current through the jumper cable to the *9* wire in the trailing A-unit. The *9* wire passes control current to the *RE* magnet valve. This establishes reverse position on the trailing A-unit, which now backs up to work with the forward movement of the leading A-unit.

If the control system is properly wired and in good order, units can be coupled together in any order. They will work together, for the *FO* and *RE* wire on the control will energize the proper wire on the trailing units to bring about proper direction of operation. The diesel unit is pretty smart. It knows when it should back up in order to move forward with the other units.




Doc Watts came up with this simplified diagram showing the w iring through a B-unit and two A-units coupled together. With this he rapidly showed electrician Belter the solution to the problem of getting his balky B-unit back into service.

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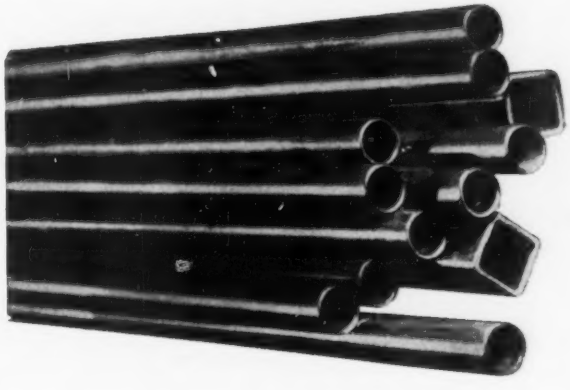

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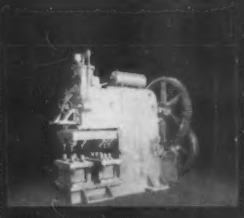

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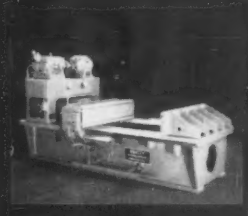

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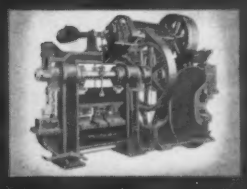

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## *GN Coach Repairs . . .*

*(Continued from page 48)*

Materials handling equipment.

the simplest jobs could become difficult.

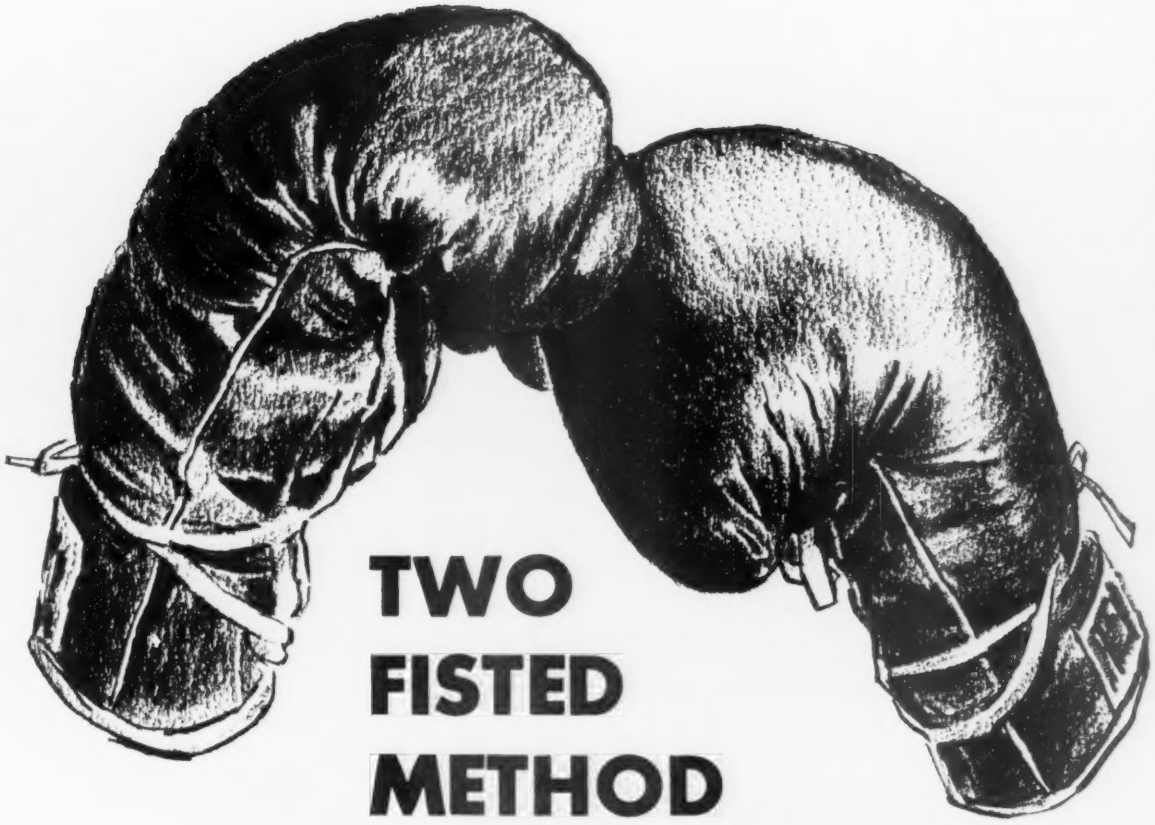
Recently, the GN placed in operation its new covered covered coach repair building. Tracks 8 and 9, which run through the building to the coach yard lead at both ends, were relocated and 625 ft of cover has been provided over each. The building is 78 ft wide. Each track will hold seven cars under cover. The building is a Butler prefab. The peaked gable roof design makes the building self-ventilating. Fourteen 30-in. standard gravity ridge ventilators remove the smoke and stale air. There are no supporting posts in the entire floor area. The floors are concrete and asphalt. Steam heat in the main working area is provided by overhead grid unit heaters equipped with electric fans.

Translucent Butler Lite Panels are used on the upper sides of the building and roof. Artificial lighting is provided by fluorescent fixtures and drop lights. Piping is installed for steam, water and air. Receptacles at convenient locations supply 220-volt a-c for welders and genemotors, 32-volt d-c for charging car batteries, and 110-volt a-c for extension lights and hand tools. Each track at the ends of the building has an electrically operated Kinnear door.

A 60-ft drop pit equipped with two Whiting electric drop hoists services both tracks. At the west end of the shop, each track has a 100-ft inspection pit.

Adjoining the north wall, a service building, 416 ft long by 24 ft wide, houses all facilities previously scattered over the area. Each of the 12 rooms is formed by concrete block partitions and all have cement floors. Ceilings in all offices, lunch, locker and toilet rooms are furred down to 10 ft and ceilings and walls are plastered.

*(Continued on Page 60)*



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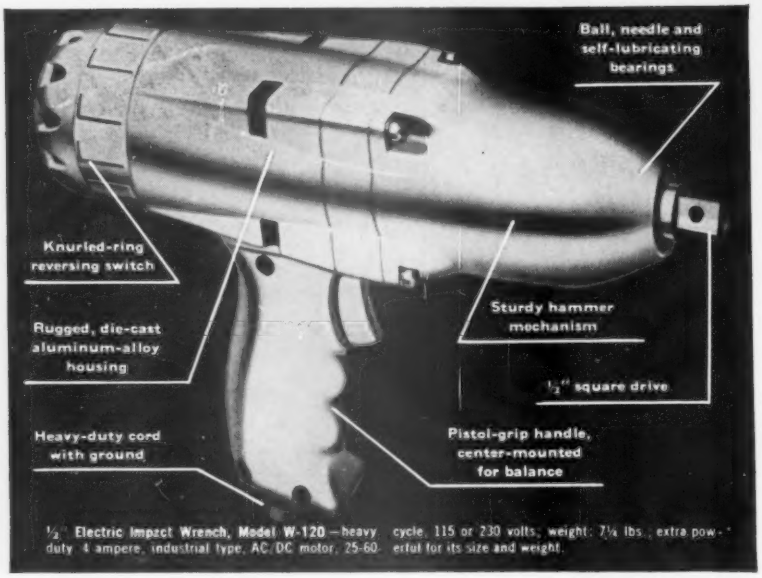
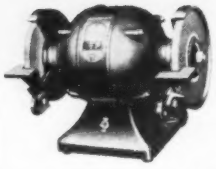



½" Electric Impact Wrench, Model W-120—heavy duty 4 ampere, industrial type, AC/DC motor, 25-60-cycle, 115 or 230 volts; weight: 7¼ lbs.; extra powerful for its size and weight.

**Non-reversible screwdriver, Model 143S**—Capacity: No.10 wood screws; adjustable slip clutch; precision ball bearings; motor: 1.7 amp., 115 or 230 volts; locking trigger switch.

**Reversible screwdriver, Model 143SR**—Switch reverses rotation; adjustable clutch for preset tension; rating same as 143S; uses a wide range of finders, bits, attachments.



**Electric bench grinder, Model BG-1**—115-volt, ¼-hp AC motor, dynamically balanced, totally enclosed; wheel size: 6" x ¾"; sealed bearings; drilled for bench mounting.

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Modern storeroom stocks repair material.

*(Continued from Page 58)*

About 50 to 75 cars are serviced in the coach yard and shop per day on a 3-shift, 7-days-a-week schedule. The total working force is 170 including clerks and foremen.

Machine tools include drill presses and small lathes. Duff-Norton air jacks are used to elevate coach bodies. Two Yale trucks, one Buda tractor and one Clark towing tractor are available for materials handling. Shop-made, wheeled adjustable height platforms enable workmen to perform all operations on sides and tops of cars.

The electric shop is equipped with a 2-ton Ingersoll industrial crane and a 1,000-amp, 45-volt GE charger. Klaxon horns signal the movement of cars along repair tracks. Three sets of double wheel storage tracks are installed inside the shop at the west end. Immediately outside, the mounted wheel storage tracks have a capacity of 50 pairs of wheels.

Servicing is done at the depot on through trains. This includes oiling, testing of air, icing, replacement of brake shoes, and insection of running gear and electrical equipment. During the winter, when terminating cars are covered with ice, they are brought direct to the heated service building. A deicer is used for removing extra heavy accumulations.

Shop repairs include maintenance of electrical heating and airconditioning equipment, and the changing of springs, wheels equalizers, brake beams and rods, center plates, and side bearings. Considerable heavy cleaning is performed and touch-up paint jobs are done either by spray or brush.

A routine sequence of operations has been developed in the shop. The cars are inspected, oiled and repaired, cleaned and then, watered and iced. They are then either placed on the outside tracks or dispatched directly.

# How to put more life in your track

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**March, 1958, p. 55*

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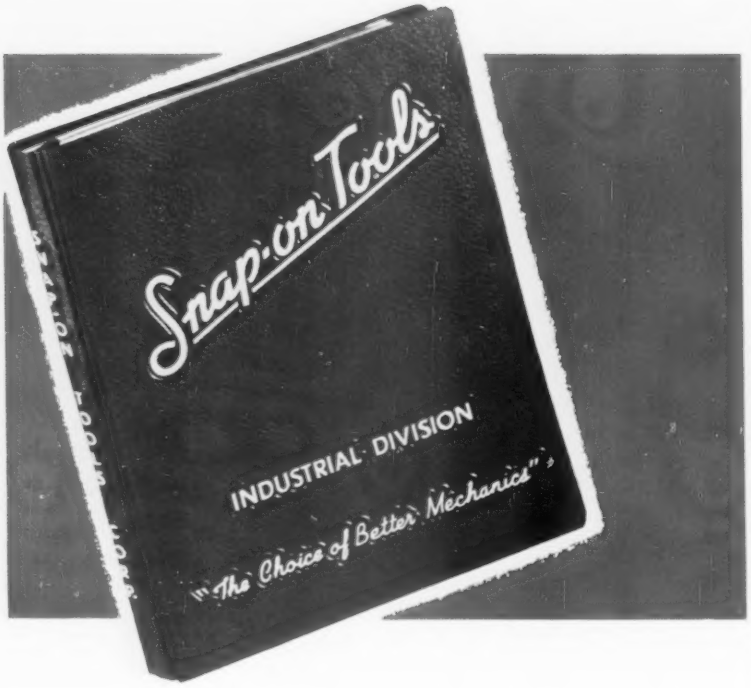
# NEW Snap-on® Railroad Tool Catalog




Here is a complete, 156-page, hand tool buying guide for railroad purchasing agents, locomotive and car shop foremen, auto and truck fleet supervisors — anyone concerned with the use of hand tools for assembly, maintenance and service of rolling stock and off-track equipment.

Several special inserts show many tools specifically designed for railroad use — car and coach set, diesel locomotive set, diesel pipefitter's set, electrician and machinist sets, diesel air brake set and other special single tools.

This book is a handy order guide for purchasing heavy-duty and extra heavy-duty wrenches and sockets. Types and sizes are shown and specifications listed clearly.

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(*Continued from Page 28*)

signed as a three-dimensional curved truss. The truss, approximately four ft deep, is designed as a unit cell system of octahedra in which the involuted 11-gage sheet steel surface material is employed both as the weathering surface and as the inner member tension system of the truss.

The outer hexagonal array is composed of four-in. steel tube sections approximately nine-ft long, positioned with ¾-in. tension rods. The steel sheet fold lines repeat the geometry of the pipe and rod system.

The Bill of Materials for the Union Dome consisted of only seven items: standard ⅛-in. sheet steel; 4-in. pipe; 1½-in. and ¾-in. rods; 2-in. sleeves; 1½-in. nuts; and washers.

The outside surface of the Union Dome is painted bright yellow and royal blue. The panels are painted yellow so as to reflect heat on a sunny day, and thus accentuate their tendency to be in tension. The outer framework of pipes and rods is painted royal blue in order to absorb the heat and thus increase the compression tendency of the framework. The interior surface of the Dome is painted an off-white.

Lighting of the Union Dome is primarily artificial since the only place where natural light enters during the day is through a 4-ft opening at the apex of the Dome. The main source of light is a unique "Wheel of Light." It is 332 ft in diameter and consists of a circle of 106 color-corrected, 1,000-watt, mercury-vapor lamps. The "Wheel of Light" is suspended 34 ft above the work areas and follows the pattern of the radial tracks below. It provides 70 to 90 foot-candles of illumination for all work areas. Sixty additional lamps of this kind, with peach-colored filters, give the roof of the Dome a warm-toned indirect lighting effect.

The Dome and its circular, wheel-like repair operation provide a most efficient utilization of space; concentration of activity; coordination of all areas from one central location; ease of materials handling; and efficient use of modern equipment. The Dome was constructed because it is an economical and efficient shelter for such a high capacity tank car repair facility with its circular layout. Outdoor work, weather interruptions, and delays characteristic of conventional repair shops where work is deployed along a straight-line system are eliminated.

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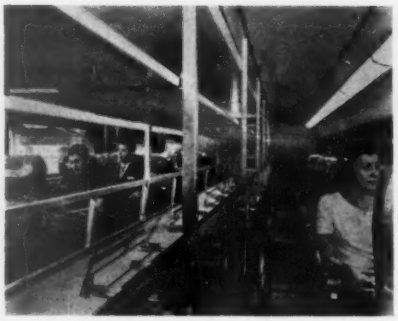
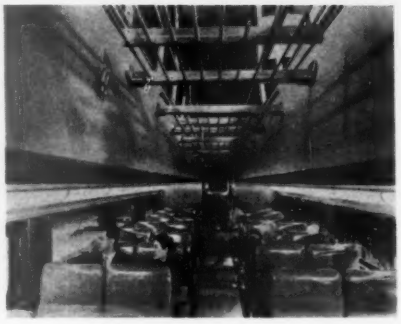
## *C&NW Bi-Level Trains*



Single reclining seats on the upper level are proving attractive for passengers traveling alone.



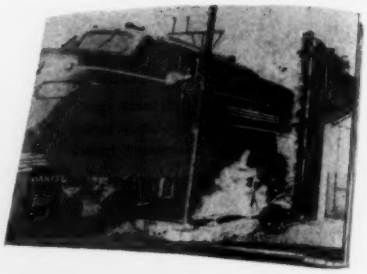
Baggage racks for lower level, where 64 passengers can be seated, are located over center aisle.

(*Continued from page 32*)

main air ducts heat each of the new cars. Heating elements are also located under the vestibule steps to prevent icing.

The 8-ton self-contained cooling units are located in the compartment over the center-entrance vestibule. Each unit supplies and circulates cooled air for half of the carbody. Because all of the motors in this air conditioning equipment are driven by a-c, it is expected that maintenance will be simplified because brushes are eliminated.

Most of the interior surfaces of the cars are faced with integrally colored plastic. The reclining coach seats all are covered with zippered, synthetic-fabric seat covers. The C&NW actually got two sets to simplify cleaning and replacement. All windows are glazed with graduated-tinted safety glass. Shades are unnecessary. The four wheel trucks of all their cars are fitted with roller bearings and package brake units with Cobra shoes. The use of these package units has resulted in a weight reduction of 2½ tons per car.

# Guide to lowest cleaning cost

Major cost in cleaning? *Man-hours.* How to cut them? *Modern-methods,* and the right *material.* This book tells about both. It's an authoritative guide to the lowest cost-per job.

Divided into eight basic railroad cleaning categories, it details specific procedures and materials for such jobs as cleaning car exteriors ... running gear and trucks ... cooling systems ... parts ... and many, many more.

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**RAILROAD DIVISION**

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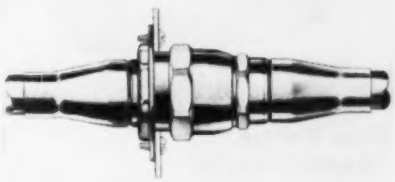
(*Continued from page 16*)

24¼ in. deep, and weighs 100 lb. It has four lower drawers, each 6¾ in. deep, 21 in. wide, and 15¼ in. long, and two top drawers, each 1⅝ in. deep, 21 in. wide, and 15¼ in. long. The parts storage section mounted on top of the drawer section has 18 compartments. In front of this section is a 24½-in. x 13-in. work area. This space can also be used to transport bulky replacement parts, motors, etc. A 1-in. high lip prevents tools or parts from sliding off. *Snap-On Tools Corporation, Dept. RLC, 8028 28th ave., Kenosha, Wis.*



## Improved Refrigerant Coupling

A greatly improved self-sealing coupling, the 5500 Series, has been developed primarily for commercial and residential air-conditioning and refrigeration units where evaporator and condenser sections are built separately. It is suitable for use with numerous refrigerants, including F-12 and 22 and similar compounds.

The 5500 coupling permits factory testing and precharging of air conditioners. They can then be shipped and stored fully charged with refrigerant, substantially reducing field installation time and costs. The coupling is leakproof; when disconnected, the coupling halves seat tight to prevent loss of refrigerant and admission of air or foreign particles into the refrigerant system. *Aeroquip Corporation, Dept. RLC, Jackson, Mich.*

## Petroleum Pumps

"Big-Flo" high-capacity submersible pumps are for use in underground storage tanks, tank farms, terminals and on railroads. They have 1-, 1 ½-, 2-, 3-, and 5-hp motors, a capacity to 260 gpm, and will handle any petroleum products practical to pump, including gasoline, fuel oil, diesel oil and kerosene. All pumps will fit through a 6-in. tank opening. The motor shaft and pump are direct driven, and the entire unit is lubricated by the fluid pumped. Vapor lock is said to be eliminated because the fuel is under pressure from the pump in the tank to the discharge nozzle.

Other features include windings hermetically sealed in stainless steel, simple plug-in connection between motor and lead wires, self-equalizing and self-leveling thrust bearing

THIS CRANKSHAFT JOB NEEDS A SPECIALIST

This is specialized work, rebuilding crankshafts—intricate, exacting, and naturally expensive. It's the kind of work that demands a specialist . . . and we are just that!

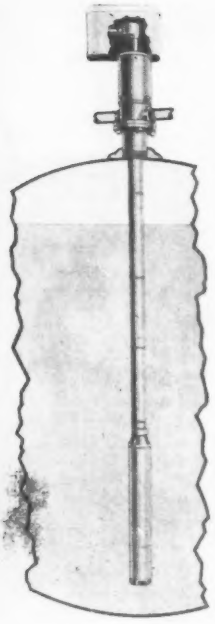
We've specialized in rebuilding crankshafts, because since 191 we've *made* crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

*For more details on crankshaft repair write for Bulletin RC 1*

This is a finished, repaired crankshaft, after processing by National Forge.

NATIONAL FORGE AND ORDNANCE COMPANY

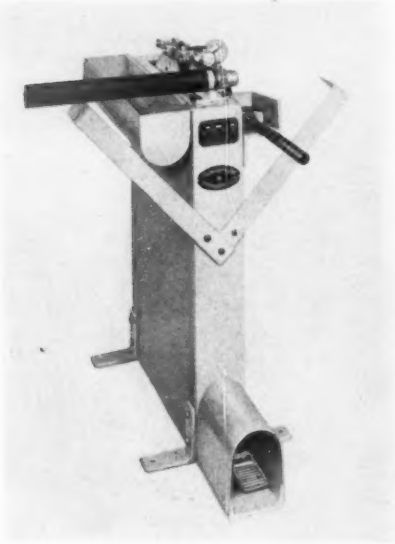
*Irvine (Warren County), Pa.*



and stainless steel motor shaft. A device in the motor protects against all conditions of overload, and automatically stops the motor if the tank pumps dry. *Red Jacket Manufacturing Company, Dept., RLC, P.O. Box 270, Davenport, Iowa.*

## Hose Clamping Machine

A hose clamping machine, Tension-Air Model TA-1, makes possible uniform clamping through pre-selected air-pressure which actuates the clamping tool. The complete operation consists of placing the hose and the clamp in the machine and stepping on a pedal. The clamp is then locked securely with a single mallet blow and the tail piece is broken off flush with the Lok by a twist of the wrist. The machine is also fitted with a clamp remover. *Punch-Lok Company, Dept. RLC, 321 N. Justine st., Chicago 7.*



## Dual Range Therm-O-Meter

A dual range Therm-O-Meter with a self-shielded core magnet meter movement is designed for measuring temperatures of gas, liquid, or solids used in air-conditioning, heat-


America's foremost engineered lettering tools

designed to reduce your present costs 50 to 80%

Used today by 1/3rd of the Nation's leading Railroads . .

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Spray it— STENCILS

PRESSURE SENSITIVE TYPES

Easy to apply. No skill required. Produces the most accurate and durable type of lettering, numerals, medallion, and other types of markings. Adds long life to your identification or advertising on all your equipment . . .

Whatever your lettering problems may be regarding identification, advertising, reflective or non-reflective, the DEMP-NOCK LETTERING SYSTEMS can help you get the job done in less time.

For additional information write Dept. RR-100

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RAILWAY LOCOMOTIVES & CARS
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ing, refrigeration, freezer storage, etc. Model 389-3L has two ranges—a low from —50 to 100 deg F, and a high from 100 to 250 deg F. It can accommodate three leads simultaneously with separate readings through one selector switch on the front of the instrument. Readings are made in a matter of seconds. Overall accuracy is plus or minus 3 deg F in any position; at near center, within plus or minus 2 deg F. *Simpson Electric Company, Dept. RLC, 5200 W. Kinzie st., Chicago 44.*

## Supply Trade Notes

(*Continued from page 10*)

*Thompson,* railroad sales manager, resigned, assigned to *L. C. Morris,* assistant sales manager.

■

INTERNATIONAL NICKEL COMPANY.—*Albert P. Gagnebin* elected a vice-president and *Joseph M. Weldon* an assistant vice-president.

Edgar K. Lofton

SKF INDUSTRIES, INC.—*Edgar K. Lofton,* 700 Cambridge Road, Bala Cynwyd, Pa., appointed field engineer to service railway accounts in eastern United States.

■

JERSEY BOLT & SPIKE CORP., FLANNERY PRODUCTS DIVISION.— Jersey Bolt & Spike Corp., Newark, N. J., has acquired the manufacturing facilities of the Flannery Bolt Company which is now the Flannery Products Division of Jersey Bolt. Operations of Flannery Bolt being transferred from Bridgeville, Pa., to 8 Lister ave., Newark.

■

THERMO KING CORPORATION.—General offices, engineering and service departments being moved from 44 South 12th street, Minneapolis, to Bloomington, Minn., plant where a new addition has been opened at 314 West 90th street.

■

K W BATTERY COMPANY.—*William T. Bardouski* appointed sales representative, western Illinois and eastern Iowa.

■

BUFFALO BRAKE BEAM COMPANY.—*Elmer E. Burk* appointed general manager at Lackawanna, N. Y.

■

PULLMAN-STANDARD CAR MANUFACTURING COMPANY.—*J. W. Miller* appointed assistant vice-president in Birmingham, Ala., sales office.

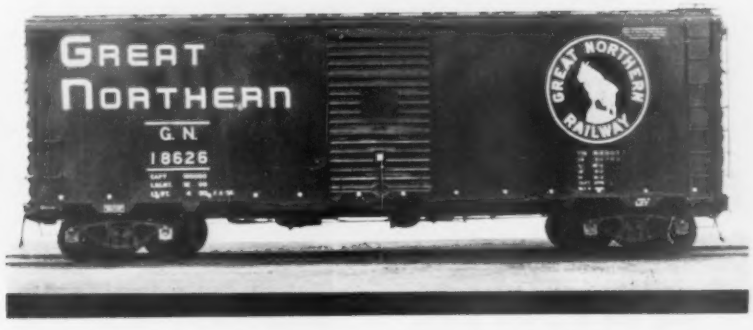

**For Restoring B and C Floors**

# GREAT NORTHERN

**is using time-proven**

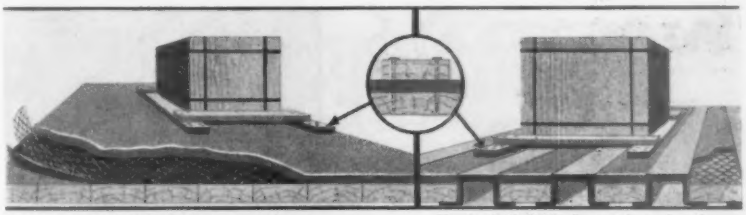
# Plastinail*

**Nailable Cement Flooring**




REPORTS THE GREAT NORTHERN: *"We made our first tests with Plastinail back in 1949. Since that time we have Plastinailed several hundred cars with very satisfactory results."*

Do you have the Plastinail story? Applied to a sound B or C floor, it will provide 7 or 8 years or more of Class A service. And it's a better floor — smooth, inorganic, non-absorptive, easily prepared, nailable. Yet, Plastinail costs less than a new wood floor. The first cost is less. And the service is supreme because wood and Plastinail is 79% stronger than wood alone.



Plastinail Nailable Cement Floor in standard box car

Plastinail Nailable Cement in conjunction with steel as an original floor

**F. E. SCHUNDLER & COMPANY, INC.**

**504 Railroad St. Joliet, Illinois**

PRIME MANUFACTURING COMPANY. —*J. E. Vaughan* elected president to succeed *H. G. Wild*, who continues with company as vice-president and treasurer. Mr. Vaughan previously secretary in charge of manufacturing and purchasing. *William H. Welty* appointed vice-president in charge of sales.

■

ALCO PRODUCTS, INC.—*Robert G. Koob*, district service manager, appointed transportation products sales representative at New York, succeeding *James L. Layton*, transferred to Los Angeles. *T. E. Fryar*, assistant renewal parts manager at Los Angeles, appointed renewal parts and warehouse manager.

■

SPRING PACKING CORPORATION.—*Robert E. Waller* elected vice-president and treasurer.

■

SHELL OIL COMPANY. — *Thomas R. Charlton* appointed regional manager, Railway Sales Department, Chicago, succeeding *L. L. Butcher*, retired.

■

GENERAL MOTORS CORPORATION, ELECTRO-MOTIVE DIVISION — *Harry E. Schneider*, manufacturing manager of Plant Two, Chicago, appointed manager, succeeding *Edgar W. Lister*, retired.

■

JOSEPH T. RYERSON & SON, INC.—*Paul J. Fountain*, assistant manager of stainless steel sales for the Boston plant named manager of stainless-steel sales, replacing *Philip B. Van Horne*, now consultant, stainless sales.

CHROMIUM CORPORATION OF AMERICA.—*George O. Whitesell* appointed sales and service engineer for railroads in the southeastern and eastern United States. Mr. Whitesell formerly with Oakite Products, Inc.

■

ALAN WOOD STEEL COMPANY.—*James F. McCrudden, Jr.*, appointed district sales manager in charge of New York office.

■

WESTERN INDUSTRIES, INC.—Activities previously contained in four separate buildings have now been consolidated at 2726 W. 36th Place, Chicago.

■

JOY MANUFACTURING COMPANY.—Boston branch office formerly at 88 Brookline avenue, now at Second avenue, Burlington, Mass.

■

A. M. BYERS COMPANY.—*Calvin L. Wright* appointed field service engineer at Baltimore, Md., succeeding *V. H. Ross*, retired. *Robert B. McQuarrie* appointed Northwest Coast field service engineer, with headquarters in Russ Building, San Francisco.

■

OAKITE PRODUCTS, INC.—*George M. Seib*, secretary, appointed vice-president.

■

GOULD-NATIONAL BATTERIES, INC.—*W. H. Mowers* appointed railroad sales representative, Industrial Division, with headquarters in New York.

MCGRAW-EDISON COMPANY. — *E. Woodward Allen*, vice-president of Thomas A. Edison Industries, and manager of engineering, Storage Battery Division, has retired.

■

AIR REDUCTION SALES COMPANY, A DIVISION OF AIR REDUCTION COMPANY.—*Fred T. Wilson, Jr.*, appointed manager at New Orleans. *E. C. Kennedy* succeeds Mr. Wilson as assistant manager-sales at New Orleans.

■

SCULLIN STEEL COMPANY.—*Thomas W. Pettus*, executive vice-president, appointed president.


# Eastern Car Maker Saves with ARCAIR

One of the largest manufacturers of railway rolling stock has adopted the Arcair process as standard procedure for defective weld removal, after exhaustive test evaluation.

Now Arcair torches using ¼" Copperclad electrodes are gouging out imperfect welds in just 1/3 the time formerly required. And re-weld is easier with surfaces Arcair-clean and Arcair-smooth.

Operators like Arcair for ease of control and versatility of operation. Arcair does not "lose the groove" or damage the parent metal on either side.

You'll like Arcair savings, too! Basic simplicity—electric arc plus ordinary compressed air — makes Arcair the new, efficient, cost-cutting answer to your metal removal problems.

Write today for complete information!

Arcair Metal Removal Torches

474 S. Mt. Pleasant St., Lancaster, Ohio


## HELPS FROM MANUFACTURERS

**The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.**

PORTABLE DC HYPOTS. Bulletin 5-1.2, "DC High Potential Tests to 30,000V," details full specifications and specific application data of some 15 DC Hypot models covering output ranges of 5, 10, 20 and 30 KV DC. (Write: *Associated Research, Inc.*, Dept. RLC, 3777 West Belmont ave., Chicago 18.)

HARD SURFACING ELECTRODES. "New Hard Surfacing Fact File," on 3 x 5-in. cards, gives data on Murex line of 88 types and sizes of Hardex hard surfacing electrodes and rods. (Write: *Metal & Thermit Corp.*, Dept. RLC, Rahway, N.J.)

GENERAL PRODUCTS. 88-page catalog, lists, in concise form, diverse activities of Ex-Cell-O Corporation, which include boring machines, grinding machines, railroad pins and bushings, cutting tools, drill jig bushings, etc. (Write, on company letterhead: *Ex-Cell-O Corporation*, Dept. RLC, 1200 Oakman Blvd., Detroit 32.)

COUPLER PARTS. Coupler Parts Catalog No. 12858 shows in actual photographs all AAR standard coupler parts, yokes, and associated yoke parts. Lists also Standard coupler shanks, bushings, and maintenance gages. (Write: *Railway and Mine Division, National Malleable & Steel Castings Co.*, Dept. RLC, 10600 Quincy ave., Cleveland 6.)

INSULATION ADHESIVES AND SEALERS. 4-page folder describes four typical applications of adhesives for bonding insulation and insulating sealers for the heating, ventilating, railroad, and other industries. Chart lists properties, uses, application methods, and coverage of the adhesives and sealers. (Write: *Adhesives, Coatings and Sealers Division, Minnesota Mining & Manufacturing Co.*, Dept. RLC, 423 Piquette ave., Detroit 2.)

CABOOSE POWER SUPPLY. 4-page bulletin, GEA-6630, describes new 1-kw packaged power supply for railway caboose radio

communications, electrical marker lighting, and interior lighting. Shows how unit operates and includes schematic diagram, performance curve, outline dimensions and specifications. (Write: *General Electric Company*, Dept. RLC, Schenectady 5, N.Y.)

WELDING SUPPLIES AND ACCESSORIES. 52-page catalog, Form ADC 848C, covers Airco's complete line of fluxes and ferrous and non-ferrous rods for gas welding and accessory items, such as protective clothing, goggles, electrode holders, weld cleaning tools, etc., both for arc and gas welding. (Write: *Air Reduction Sales Company, a division of Air Reduction Company*, 150 E. 42nd st., New York 17.)

UNIVERSAL LOCOMOTIVES. Colorful booklet describes in detail G-E universal-type diesel-electric locomotive designed for all types of service in all parts of the world. Three-page four-color fold-out shows all components of a typical locomotive. Gives data on universal's four-cycle diesel engines, their electric drive traction motors and high-speed trucks, and basic specifications on six currently available models ranging in size from 990 to 1,980 gross horsepower. (Write—on company letterhead: *Transportation Sales Department, International General Electric Company*, Dept. RLC, 150 East 42nd st., New York 17.)

FREIGHT LINER. 4-page folder describes "3 quick steps to a superior coating. . . ." for covered hopper cars through the use of Freight Liner 410, a white plastic coating. (Write: *Archer-Daniels-Midland*, Dept. RLC, 700 Investors Bldg., Minneapolis 2.)

FLEXIBLE CORDS AND PORTABLE CABLES. 64-page Bulletin 1108 gives dimensional data, engineering information, and splicing and terminating instructions on Okonite's line of mold-cured Okoprene (neoprene) sheathed cords and cables. (Write: *Okonite Company*, Dept. RLC, Passaic.)

HAND OPERATED CRANES. 4-page folder DH-455-B. Gives technical data, specifications, and operating features of type B-36 underslung single bridge, hand-operated cranes with capacities of 1 to 10 tons and spans up to 50 ft. (Write: *American Chain & Cable Co.*, Dept. RLC, 929 Connecticut ave., Bridgeport 2, Conn.)

JOURNAL LUBRICATOR. 6-page bulletin gives construction details and installation data on new Cool-Pak journal lubricator. Answers 16 questions railroad men ask about it. (Write: *UniPak Corporation*, Dept. RLC, Box 8302, Pittsburgh 18.)

SAFETEE SOLVENTS. Specification sheets, bound in catalog form, outline new and unusual applications of Safetee solvents, complete specifications given for each product. (Write: *Fine Organics, Inc.*, 211 E. 19th st., New York 3.)

ENGINE MODERNIZATION. 6-page Bulletin 2010 lists "10 reasons why you should modernize your VO diesel locomotives engines the Baldwin way." Modernization of other engine parts also discussed. (Write: *Baldwin-Lima-Hamilton, Eddystone Division*, Dept. RLC, Philadelphia 42.)

# *NEW!* A 35 Ton Hydraulic Journal Jack

*First in the Industry!*

You asked for it and here it is—a brand new jack designed and built especially for servicing heavier freight cars. It can raise 35 tons 6 inches—is only 9.7 high—weighs but 55 pounds. With the 35H9.7, the job of inspecting and renewing journal brasses can now be done without the danger of overloading a lower capacity hydraulic journal jack—and the work can be done faster with less effort! If you have the problem of lifting heavy cars, we suggest you get complete details on this new 35 ton hydraulic journal jack immediately. Write the world's oldest and largest manufacturer of lifting jacks for bulletin AD-16-G.

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Ratchet, Screw,
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Ratchet Lever
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STATEMENT required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of

RAILWAY LOCOMOTIVES AND CARS

published monthly at Philadelphia, Pa. for November, 1958.

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Managing editor, Frederick N. Houser, Jr., 30 Church St., New York 7, N. Y.

2. The owners are: Simmons-Boardman Publishing Corp., 30 Church St., New York 7, N. Y. Stockholders of one per cent or more, James G. and Louise Lyne, 30 Church St., New York 7, N. Y., Arthur J. McGinnis, 30 Church St., New York 7, N. Y., Frederick A. and Artimese B. Clark, 30 Church St., New York 7, N. Y., Joseph or Katherine Sanders, 2909 Maple Ave., Dallas 4, Texas, John R. Thompson and Kathe Thompson, 79 West Monroe St., Chicago 3, Ill., Ruth Wheaton Johnson, 1615 Ravenna Blvd., Seattle 5, Wash., William E. Russell as Trustee U/W/T of Ida R. Simmons F/B/O, Mrs. E. S. Fenton, c/o Russell & Russell, 41 East 42nd St., New York 17, N. Y., J. Streicher & Co., 2 Rector St., New York, N. Y., Partners of J. Streicher & Co. are: Joseph Streicher, Jack L. Streicher, Ethel Streicher, Judson Streicher, all of 2 Rector St., New York, N. Y., Morton & Co., c/o Marine Midland Trust Co., 120 Broadway, New York 15, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

C. L. COMBES
Signature of editor

Sworn to and subscribed before me this 23rd day of September, 1958.

EDMUND J. PUYDAK

[SEAL]

(My commission expires March 30, 1959)

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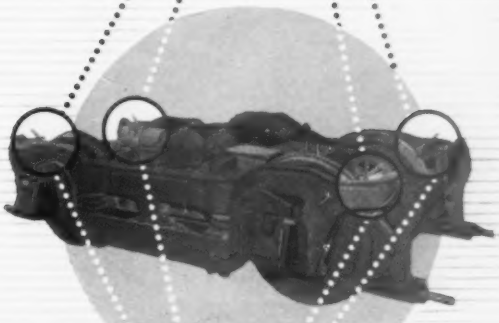
# LOCOMOTIVE WHEEL LIFE

# 30% TO 300%!



WITH *Nalco* TYPE TA **FLANGE LUBRICATOR**

USING *Nalco* **"MOLY"** STICKS

Nalco "Moly" Stick is a highly-efficient *dry* lubricant that maintains a lubricating surface between locomotive wheel flanges and track under extremes of pressure and temperature . . . without *picking up dirt and sand to form a grinding compound.* In new Nalco Type TA Lubricators, "Moly" Sticks provide automatic flange lubrication that has extended wheel life from a substantial 30% to as much—particularly on yard locomotives—as a whopping 300%!

Cost of Nalco Type TA Lubricators and "Moly" Sticks is small. Maintenance is limited to occasional stick replacements. Complete installation of lubricators on a diesel unit can be done by your shop personnel in four hours or less.

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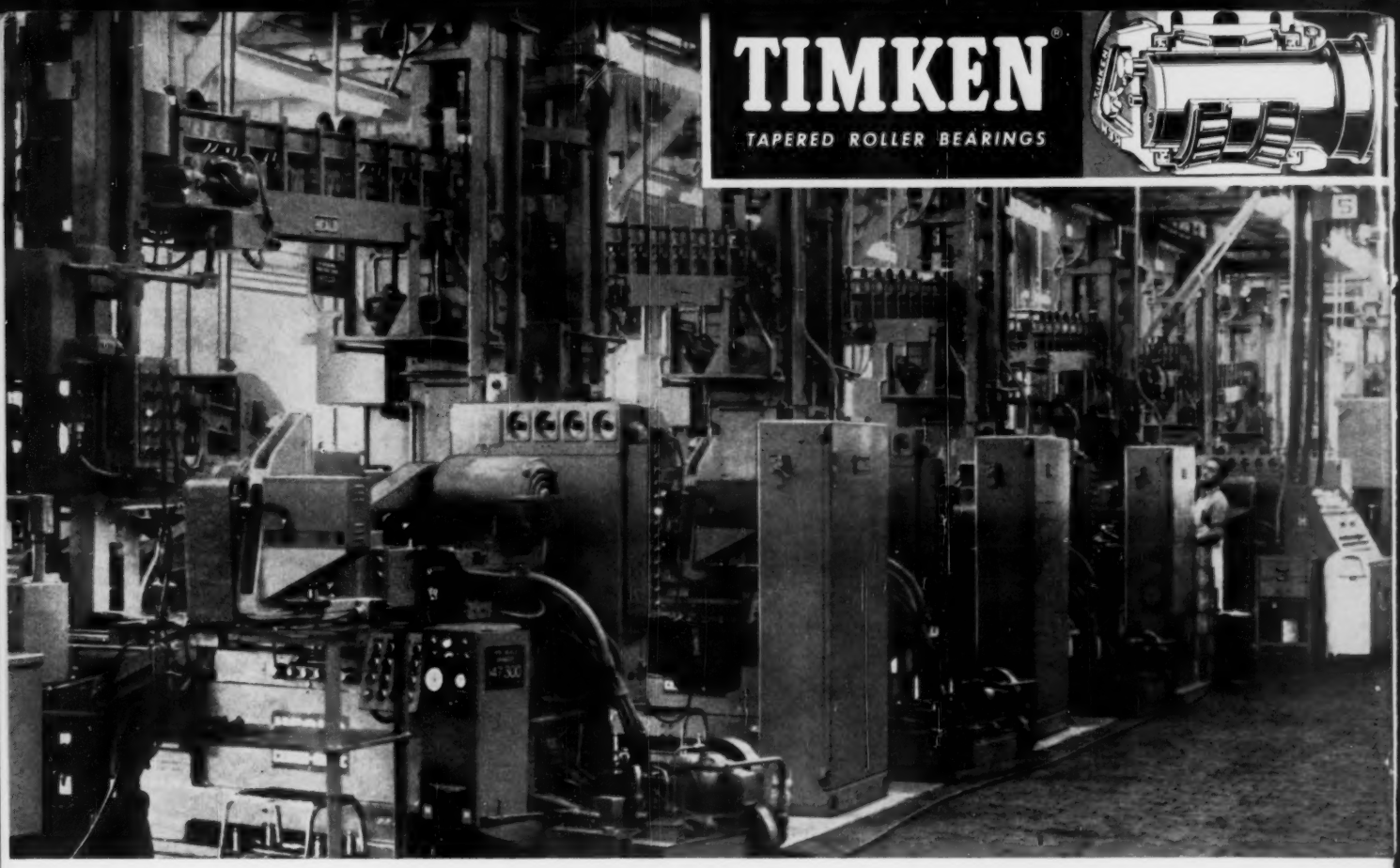
# TIMKEN®

TAPERED ROLLER BEARINGS





# This ultra-modern roller bearing plant can help you plan right now TO SAVE $288,000,000 A YEAR!

YOU'RE looking at a section of our amazing new $7,500,000 roller bearing plant at Columbus, Ohio. It turns out Timken® tapered roller bearings for freight cars only. Those ultra-modern machines (above) can mass-produce 20,000 car-sets a year—keeping costs down.

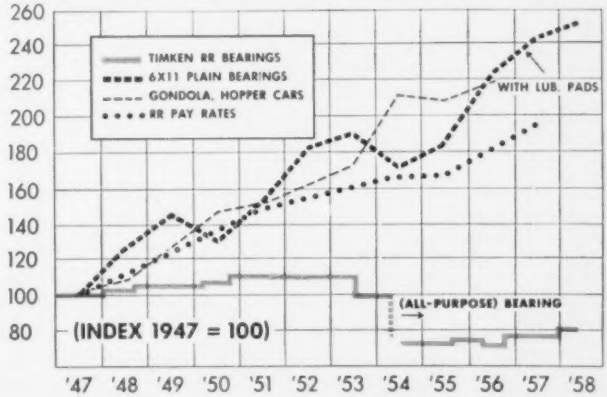
This plant is ready now to help you put *all* your freight cars on roller bearings. These "Roller Freight" cars will enable the railroads to slash their maintenance and operating costs by $288,000,000 a year—$144 per car! And if other costs keep going up (see chart at right), the investment you make in roller bearings today will pay off even more in years to come.

The best time to start these savings rolling in is right now. One smart way is to get together with the other railroads and *plan* your Timken bearing purchases, order a specified number every year. You'll not only establish more economical shop schedules—but also minimize your roller bearing costs. For example, the chart at right shows how the cost of friction bearings and other things a railroad uses have gone steadily upward while the cost of Timken roller bearings has come down and down. Keeping bearing costs down will be the automatic result of our new plant as you go "Roller Freight" on a planned basis.

Ask your maintenance and operating people what they think of "Roller Freight". One railroad's freight cars equipped with Timken roller bearings rolled over 300,000,000 car-miles with only *one* overheated bearing. On another line, Timken-bearing-equipped cars recently rolled 216,000 miles each over a 3-year period *without adding lubricant.*

Savings like these show why Timken bearings give you a 24½% return on the investment—why 69 railroads and other car owners already have over 25,800 freight cars on Timken roller bearings.

**TIMKEN BEARING COSTS HAVE STAYED DOWN WHILE OTHER RAILROAD COSTS HAVE SKYROCKETED**




SOURCES: AMERICAN RAILWAY CAR INSTITUTE • INDEX FROM AAR—ICC STUDY • AAR INTERCHANGE RULES

Start right now planning your "Roller Freight" modernization and new car program. Start switching to Timken roller bearings and take full advantage of your new roller bearing production line—the most modern in the world. The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". Canadian plant: St. Thomas, Ontario.

## "Roller Freight" is the next great step in railroading